Machine and Tool BLUE BOOK

JANUARY 1955

General Electric's Vinson
". . analyze, analyze . . "

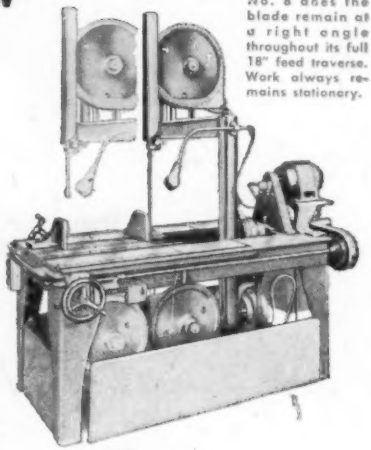
A HITCHCOCK PUBLICATION

CONTENTS ON PAGES 5 and 6

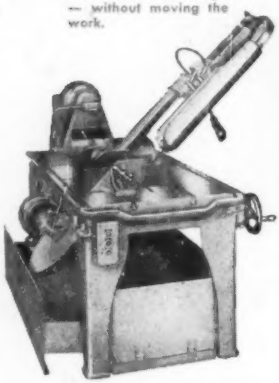
Never Confuse the No. 8 MARVEL with an ordinary Band Saw

...only the MARVEL is Universal

Only on a MARVEL No. 8 does the blade remain at a right angle throughout its full 18" feed traverse. Work always remains stationary.



Only on a No. 8 MARVEL can the saw column be instantly indexed and locked at any angle from 45° right to 45° left, and the saw then fed thru the work at the desired angle — without moving the work.



Only a No. 8 MARVEL can do all of these things: Snip-off a ½" rod or cut-off an 18" x 18" cross section.

Rough to Size and Shape

Miter

Index

cut off and shape Structural Beams

Only a No. 8 MARVEL has the large T-slotted work table, with removable quick action vise, that permits accurate set-ups of work of unrestricted sizes and shapes, special fixtures; Etc.

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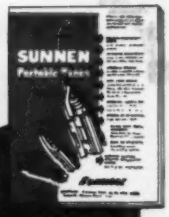

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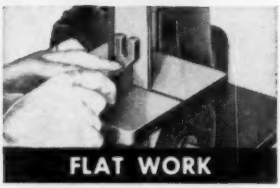

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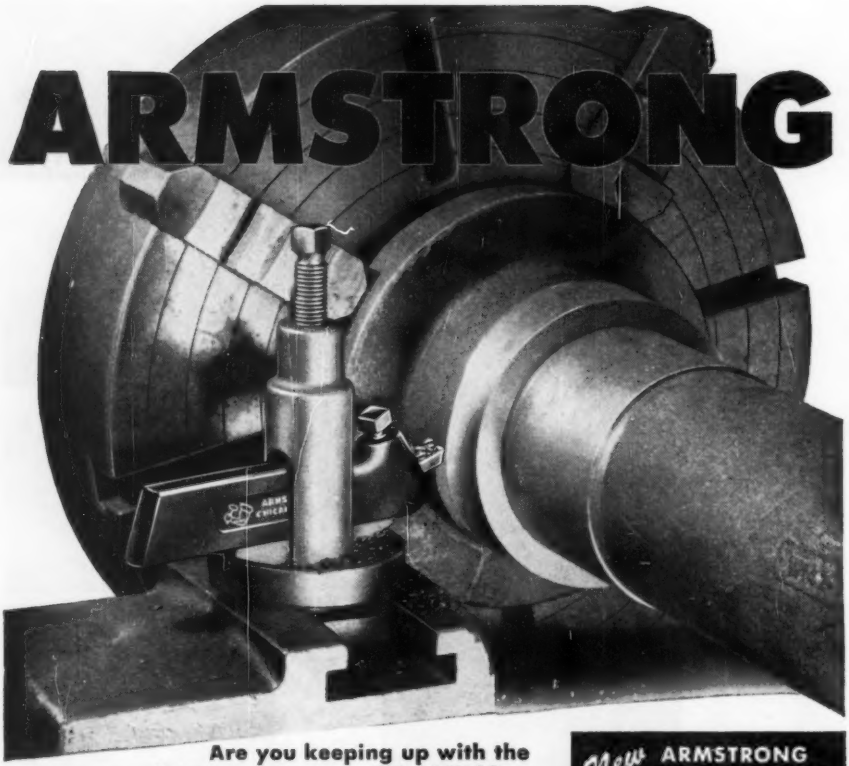

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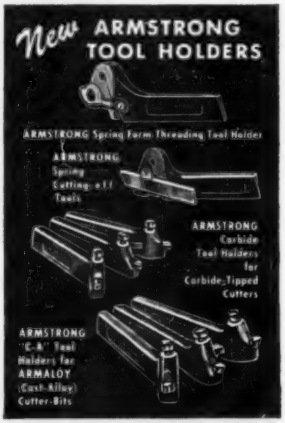
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Machine and Tool Blue Book

JAN. 1955 • VOL. 50, No. 1

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BPA

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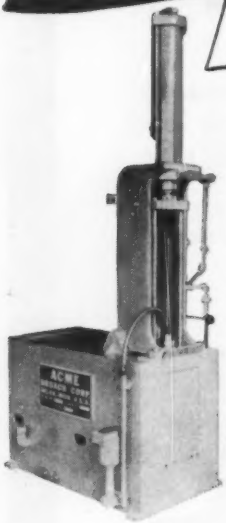

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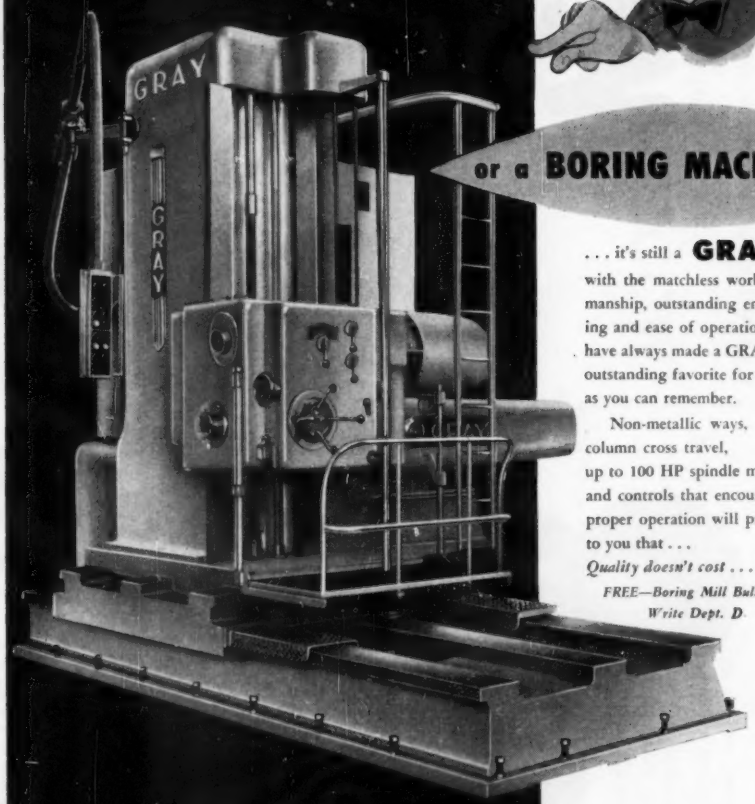

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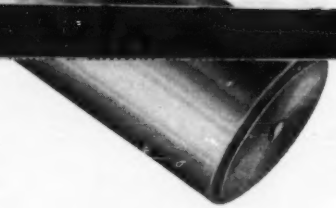

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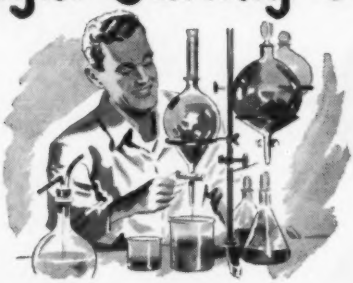
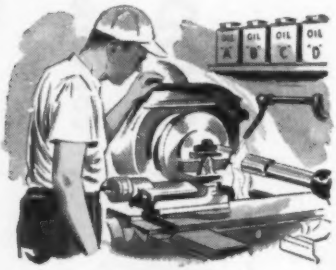


LABORATORY ANALYSIS?

Sure. But there's no formula for correlating the laboratory analysis with how well the cutting oil will work on your job. It takes years of field experience like Sun's to help you make the right choice.



ELABORATE SHOP TEST?

This will probably give you the answer. But it's expensive and interferes with production when you try to test all the oils available. Sun's experience can help keep your shop-testing to a minimum.

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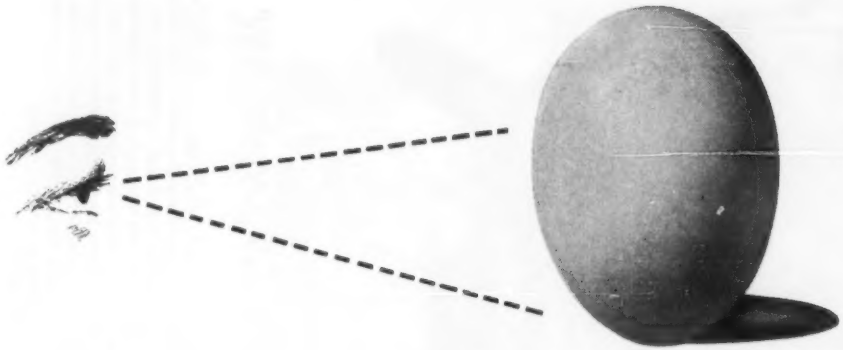

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January, 1955

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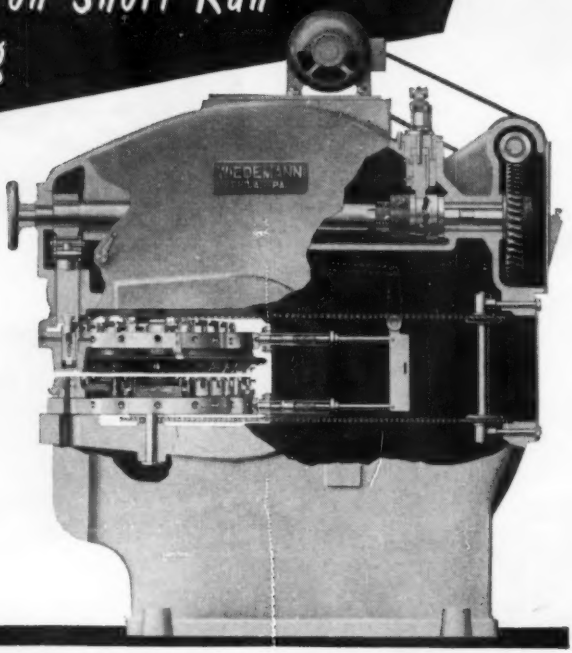
TURRET PUNCH PRESS
Pays Off on Short Run Piercing



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. . . describes in detail the application, operation and construction of the turret punch press.

WIEDEMANN MACHINE COMPANY

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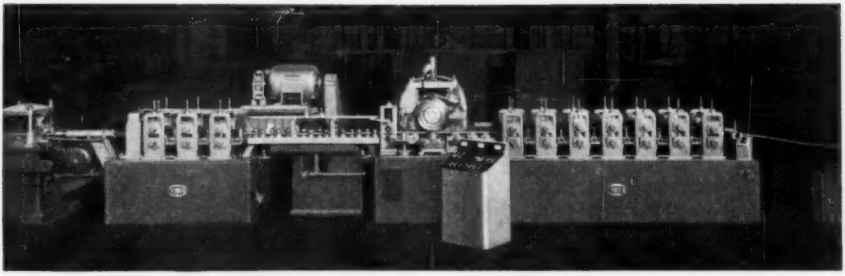

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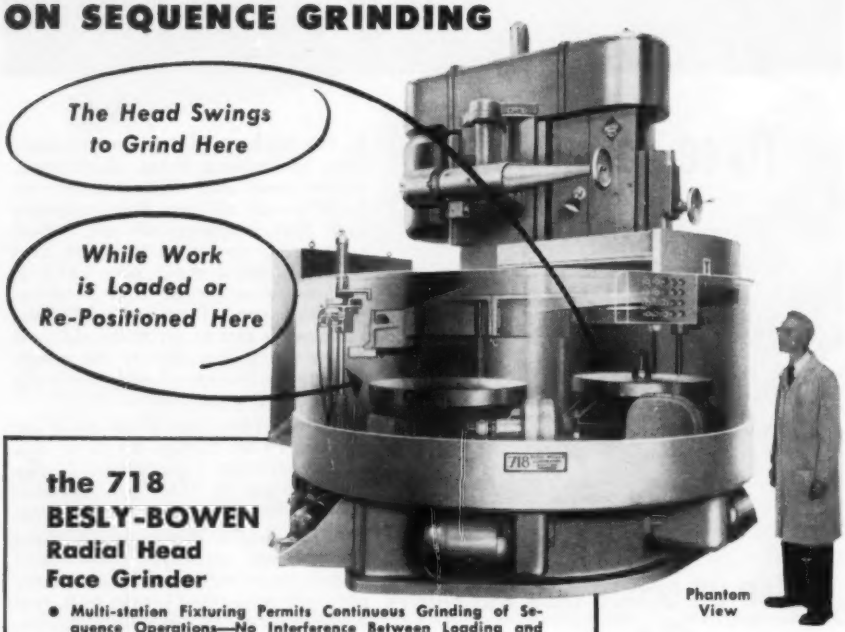
Continuous Low Cost Production

ON SEQUENCE GRINDING



Phantom View

the 718 BESLY-BOWEN Radial Head Face Grinder

- Multi-station Fixturing Permits Continuous Grinding of Sequence Operations—No Interference Between Loading and Grinding.
- Automatic Grinding Cycle.
- Automatic Size Control.
- Fixturing Flexibility — Each Rotating Station May Hold Several Fixtures, Depending on Number of Faces to be Ground.
- Single, Massive Slow-Moving Bearing Insures Accuracy with Four-Way Compound Movement . . . Up — Down — Back and Forth.
- A Wet Grinding System — Free from Flying Water and Spray.

Available in four models from 5-100 H.P.

Write for a Full Description of This Type of Grinder.

ON ONE JOB, it grinds three surfaces of a large automotive flywheel housing at a rate of one completed housing every 72 seconds! Accuracy held on this hard-to-grind thin sectioned piece is also noteworthy: with approximately 3/32-in. of stock removed from each face, work is held parallel within .003-in., flat within .005-in. and to size within .010-in.

BESLY

BESLY GRINDERS AND ACCESSORIES
BESLY TAPS, DRILLS, REAMERS, END MILLS
BESLY-TITAN ABRASIVE WHEELS
BESLY TOOL BITS

BESLY-WELLES CORPORATION

Established as Charles H. Besly and Company in 1875
122 Dearborn Avenue, Beloit, Wisconsin

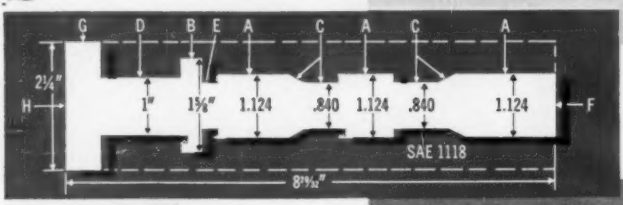
This is the difference High Velocity Turning makes

IN 1947 this job took...

11.50 min.

FLOOR TO FLOOR

A. Turn — 694 RPM — .015" Feed
B. Turn — 489 RPM — .015" Feed
C. } Form — 119 RPM — .0025" Feed
D. }
E. Face, shoulder, neck, undercut, HSS
F. Face 243 RPM — .0035" Feed
G. Knurl
H. Cut off — 243 RPM — .0035" Feed



IN 1954 this same job takes...

5.00 min.

FLOOR TO FLOOR

A. Turn — 1000 RPM — .022" Feed
B. Turn — 1000 RPM — .022" Feed
C. } Form — 340 RPM — .0033" Feed
D. }
E. Face, shoulder, neck, undercut
F. Face 489 RPM — .0033" Feed
G. Knurl
H. Cut off — 489 RPM — .0033" Feed

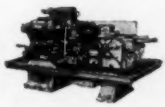
J & L TURRET LATHES GIVE...

MORE Ease of Operation
MORE Power Transmission
MORE Rigidity
MORE Accurate Stops
MORE Efficient Lubrication
MORE Coolant on Cutting Tools
MORE Accurate Results

Turning out a job like this in 5 min. calls for a lathe with plenty of power and the beef to back it up . . . a lathe like the Jones & Lamson #7A Universal Turret Lathe, which is specially designed to meet today's demand for more production at lower unit costs.

Only with a lathe like this can your shop take full advantage of the quality, productivity and lower costs offered by High Velocity Turning.

This job is one of the many turned at high speeds on our production line. Come to Springfield and see for yourself. At any rate, send for catalogs #101-A and #102.



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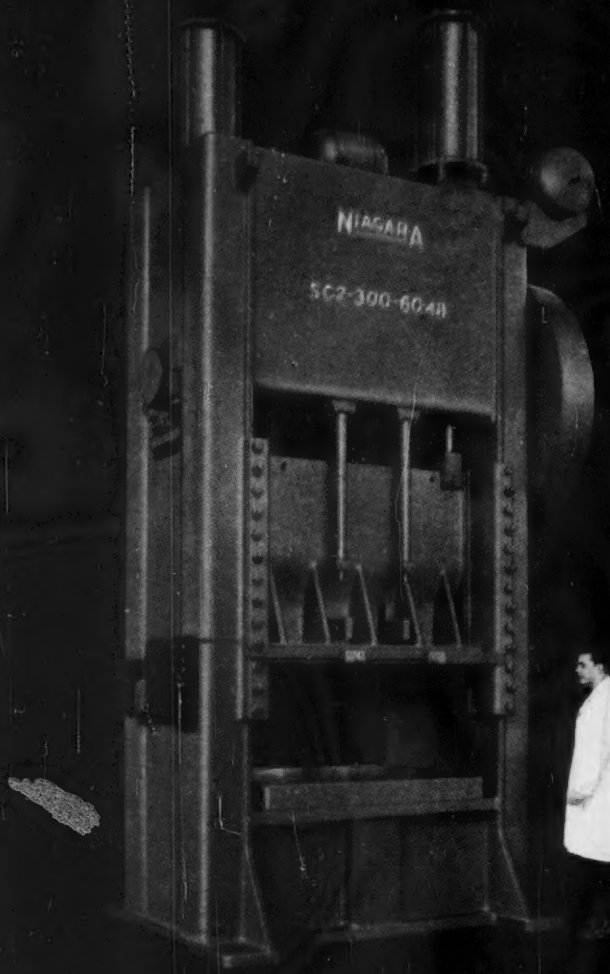
Machine Tool Craftsmen Since 1835

JONES & LAMSON MACHINE CO., 520 Clinton St., Dept. 710, Springfield, Vt., U.S.A.

J&L MACHINE TOOL DIV.

LOOK TO THIS NEW, PRODUCTION-BOOSTING LINE



50 THROUGH 300-TON CAPACITIES

NIAGARA MACHINE & TOOL WORKS 1879 75 1954

America's Most Complete Line of Presses, Shears, Machines and Tools for Plate and Sheet Metal Work

For a realistic answer to the metal stamping and forming problems of today. . . and tomorrow

DESIGN MODERNIZATION CONCEALS DRIVING MECHANISM

Fully streamlined, enclosed construction, front and back, provides pronounced advantages. There are no exposed, overhanging flywheel, clutch, brake, intermediate shaft, nor motor in rear of press to obstruct crane service, block light, throw grease and consume floor space unnecessarily . . . yet all parts are quickly accessible.

WORK-SAVING FLEXIBILITY MEETS SHIFTING PRODUCTION NEEDS

Box type welded steel slides are power adjusted through self-locking, worm driven, barrel type connections to accommodate a wide range of die heights and to permit quicker, easier and safer die setting. Niagara electric clutch control provides trouble-free push button operation and a five-position selector switch for ease, safety and efficiency in single stroking, continuous running, jogging, reverse jogging and slide adjustment.

RUGGED, HEAVY DUTY FRAMES PROLONG DIE LIFE

All-steel, rigidly constructed frames, featuring an exclusive triple box section design, provide maximum resistance to deflection from horizontal, diagonal and torsional stresses. Greater accuracy and longer die life are thereby assured.

GREAT SHUT HEIGHT AND LONG SLIDE ADJUSTMENT

Unusually liberal shut height and extremely long slide adjustment, of both one and four-piece frame construction, permit use of a tremendous range of stamping and forming dies.

Hailed as the most progressive step in straight side, double crank press history, the new Niagara SC-2 Press Series could only have originated from a keen insight of today's metal working problems and the more challenging ones of tomorrow. In every detail of design, you'll recognize the unduplicated competence of Niagara engineers. Who else would be more mindful of press users' needs than the men who design and build America's leading and most complete line of presses, press brakes, shears, other machines and tools for plate and sheet metal work?

CHECK THE FEATURE-BY-FEATURE EVIDENCE

Preview this complete new line of straight side presses at once. Find out what they can do for you. Write for Niagara's new, illustrated Bulletin 64-H today.

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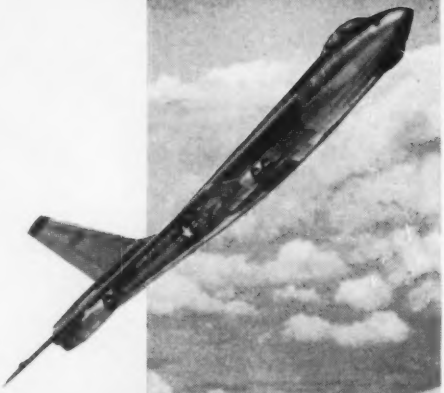
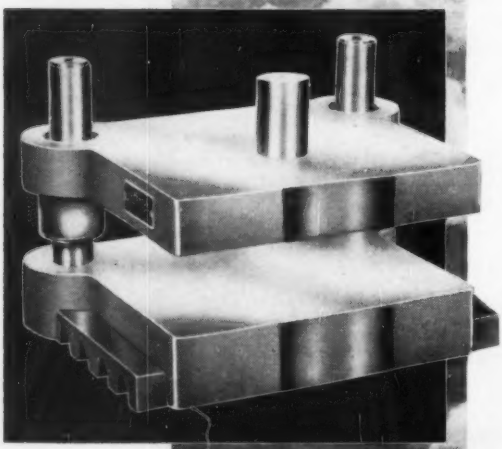
where PRECISION *is vital*

BOEING

like other American Industry relies on

SUPERIOR DIE SETS





The production of a modern jet plane is a complex operation requiring the maintenance of tolerances that were thought impossible only a few years ago. At the Boeing plants, the use of Superior Precision All-Steel Die Sets insures that the required standards are continually and efficiently maintained.

☆ ☆

SUPERIOR Die Sets are Custom Fitted to your individual needs. Made of high grade steel plate, with precision center marks and exclusive safety features, Superior die sets can provide the same guarantee of accuracy for your product and at the same time reduce your costs by cutting materially the time required for handling, assembly or disassembly.

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For full details write for our Free Catalog. It contains helpful data on Superior die sets and diemakers' supplies.

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2754 S. 19th St., Milwaukee, Wis.

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TREE TOOL & DIE WORKS, RA

2 UV VERTICAL MILL

Versatility plus

The TREE 2UV Vertical Mill combines rigidity and flexibility to make it one of the most versatile on the market today. The following features make it adaptable to a wide range of jobs:

- Fully universal milling head with power feed
- Dovetail type ram—360° movable turret
- Table—10½"x42"—power feed and rapid traverse
- Hardened and ground lead screws by Ex-Cell-O
- Ample range: 25" longitudinal, 11" transverse, 17½" vertical travel
- Weight—2400 lbs.

Write for complete information . . .

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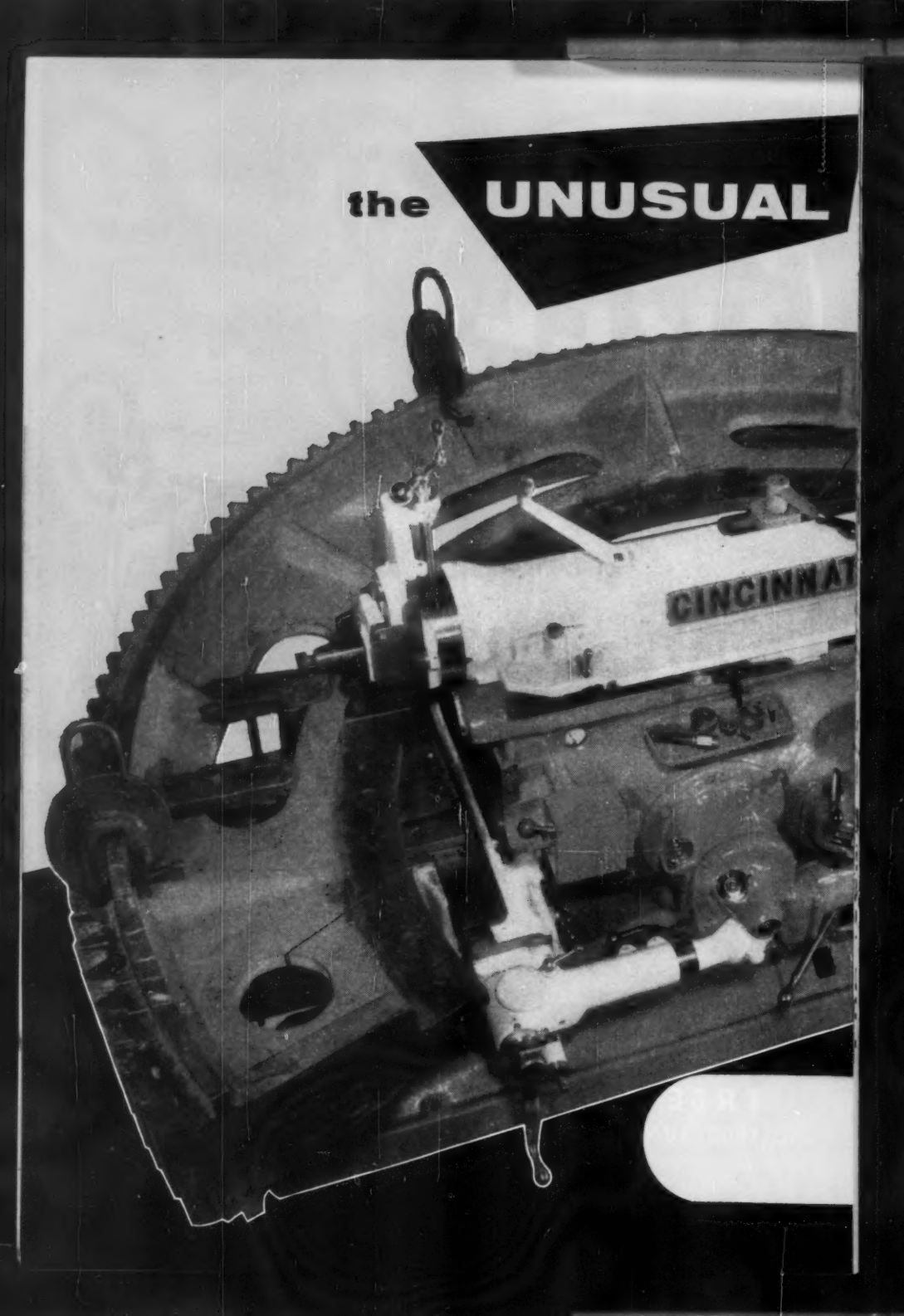
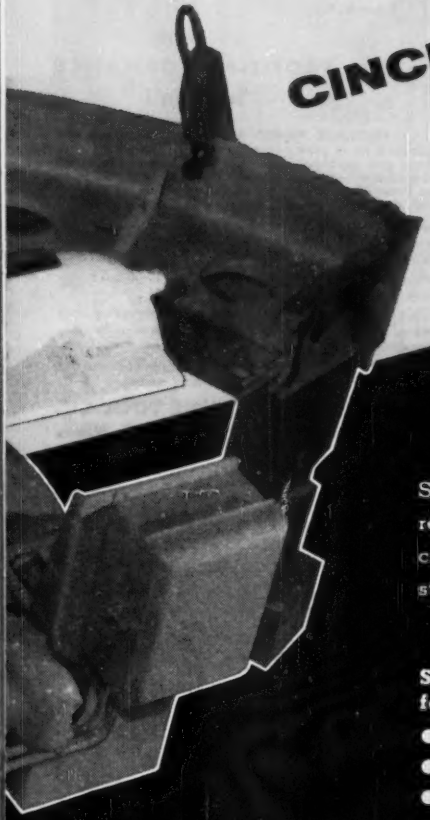
Manufacturers of—MH-4 UNIVERSAL MILLING HEADS
TB-4 TAPER BORING TOOLS

the UNUSUAL



is NORMAL for CINCINNATI SHAPERS



Stress relieving this massive gear required unusual rigidity of table and cross slide, and accurate starting and stopping of the shaper.

Some money making Cincinnati features:

- Electro-Magnetic Clutch and Brake.
- 50 P.S.I. automatic lubrication.
- Full control of all machine functions at operator's position.
- Solid, extended ram ways and many other features.

Write for Catalog N-6.

Photos courtesy Coeur d'Alene Hardware & Foundry Company, Wallace, Idaho

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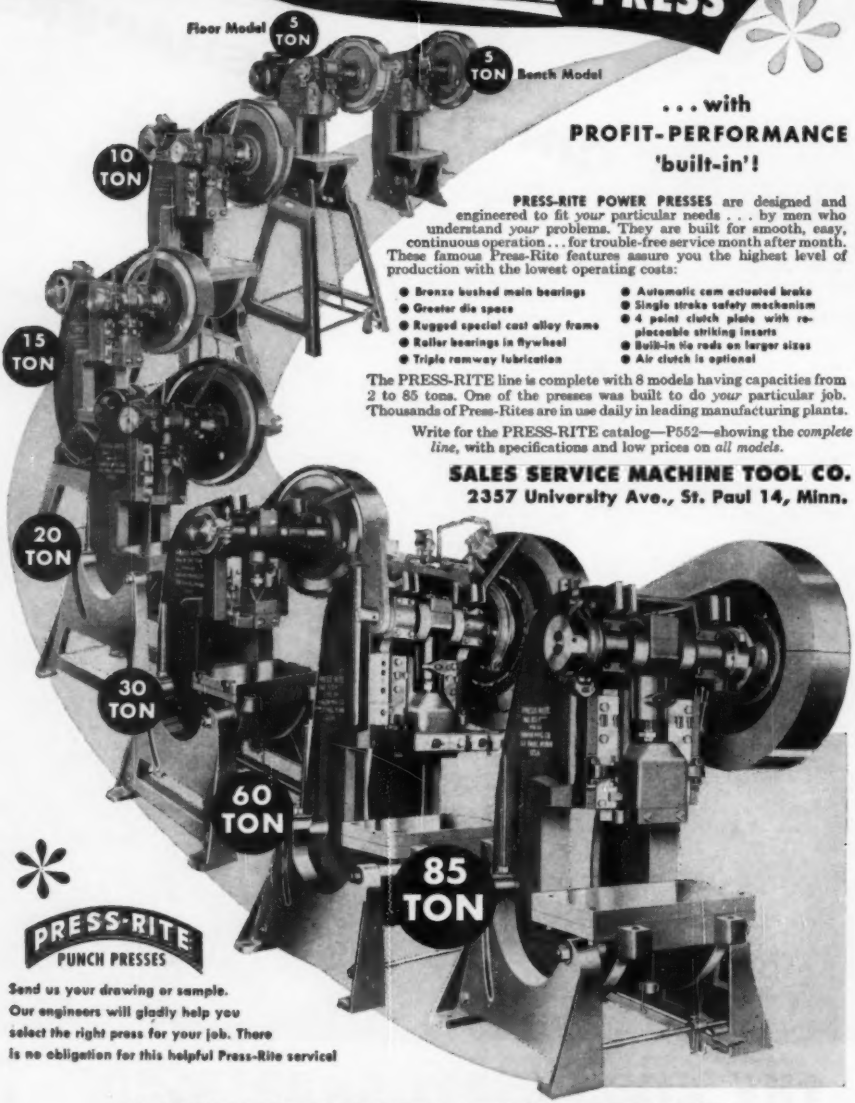

. . . with PROFIT-PERFORMANCE 'built-in'!

PRESS-RITE POWER PRESSES are designed and engineered to fit *your* particular needs . . . by men who understand *your* problems. They are built for smooth, easy, continuous operation . . . for trouble-free service month after month. These famous Press-Rite features assure you the highest level of production with the lowest operating costs:

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- Greater die space
- Rugged special cast alloy frame
- Roller bearings in flywheel
- Triple ramway lubrication
- Automatic cam actuated brake
- Single stroke safety mechanism
- 4 point clutch plate with replaceable striking inserts
- Built-in tie rods on larger sizes
- Air clutch is optional

The PRESS-RITE line is complete with 8 models having capacities from 2 to 85 tons. One of the presses was built to do *your* particular job. Thousands of Press-Rites are in use daily in leading manufacturing plants.

Write for the PRESS-RITE catalog—P552—showing the *complete line*, with specifications and low prices on *all models*.

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2357 University Ave., St. Paul 14, Minn.

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PUNCH PRESSES

Send us your drawing or sample. Our engineers will gladly help you select the right press for your job. There is no obligation for this helpful Press-Rite service!

WATCH FOR THE NEW 45 TON PRESS-RITE

Attain —

Real TOOLROOM Efficiency

with OLIVER DIE MAKING MACHINES

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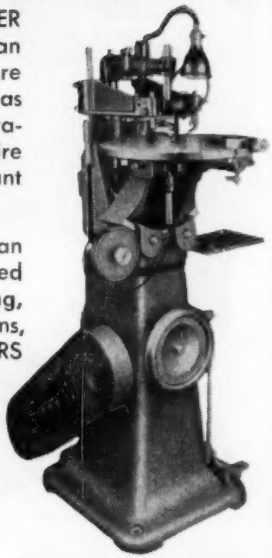
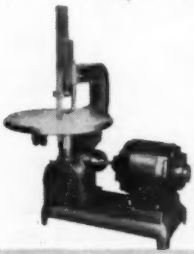


Engineered, designed and built by OLIVER of Adrian these die makers have proved themselves unsurpassed for accuracy. Proved invaluable on Production Filing, Experimental Work, Metal Patterns, Cams, Gages and Templates, OLIVERS have been serving industry for almost 40 years. Cut down your die making costs . . . increase your output . . . saw, file and lap with OLIVER DIE MAKING MACHINES.



Oliver Die Makers available in 5 models —

The Bench Model S-1 (illustrated) is a single speed die maker for use on tool steel up to 1" thick.

The Heavy Duty Model (illustrated) has 6 speeds, works in metal up to 3" thick, has variable strokes to 5" with hydraulic feed.

Write Today For Complete Technical Data on
OLIVER DIE MAKERS
See our catalog in Sweet's Directory

MACHINE TOOLS by OLIVER include:
AUTOMATIC DRILL GRINDERS
TOOL & CUTTER GRINDERS
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DIE MAKING MACHINES

OLIVER INSTRUMENT CO.

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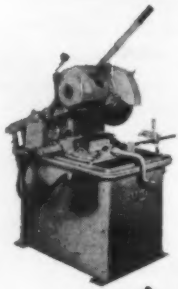
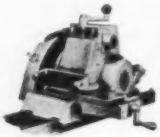
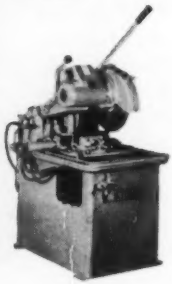
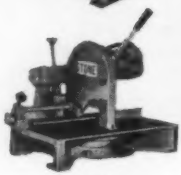
YOU CAN *Cut in Seconds* with a fine finish

BARS	PIPE - TUBING	STRUCTURALS
EXTRUSIONS	SHEET & PLATE	MITERS









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LOOK AT THESE TYPICAL CUTTING TIMES!

COLD ROLLED STEEL—Bar Stock—1"x1½"	6 sec.
STRUCTURAL—ANGLE IRON 2"x2"x3/16"	4 sec.
PIPE—Standard Blk. 3"	8 sec.
TUBING—Stainless Steel 1¼" O.D. 1/16" wall	2 sec.
STRUCTURAL—Channel 6"—12 lb.	11 sec.
ALUMINUM—Bar Stock—1"x1½"	3 sec.
BRASS—Pipe—1½"	2 sec.
COPPER—Bar Stock—1"x1¼"	5 sec.

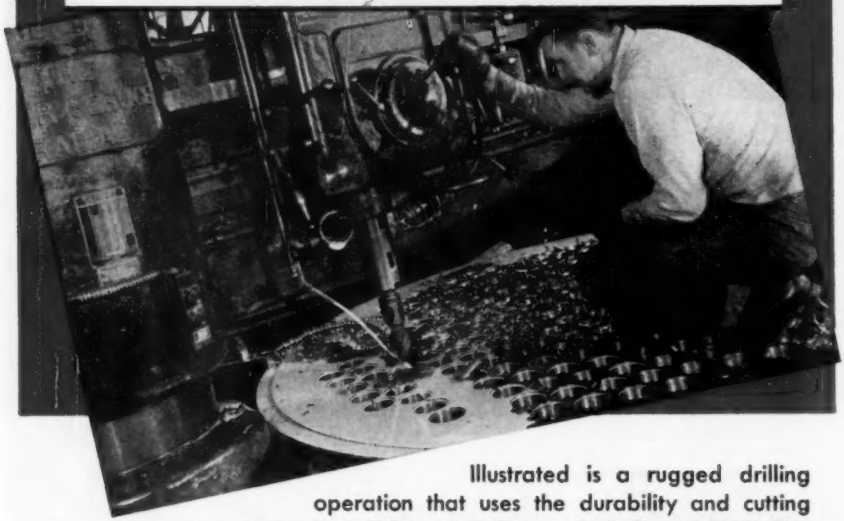
Powerful and ruggedly built, flexible and easily operated, Stone High Speed Cut-off machines are ready to give YOU all the advantages of fast, clean, low-cost cutting using abrasive wheels on ferrous metals and steel saw blades on non-ferrous metals.

Write TODAY for Complete Information and prices.

STONE MACHINERY CO., INC.

404 FAYETTE ST. MANLIUS, NEW YORK

Here's DRILLING *At Its* BEST
In Stainless Steel Tube Sheet



Illustrated is a rugged drilling operation that uses the durability and cutting speed of standard Whitman & Barnes High Speed Drills. This 446 stainless steel tube sheet for a special heat exchanger in a chemical plant requires 602 holes 2 11/16" in diameter be drilled through the 2½" depth of the sheet. W & B drills are operated without regrinding for approximately four hours at 69 R.P.M. and with .012" feed. For the best in drilling performance on your every operation—specify W & B.

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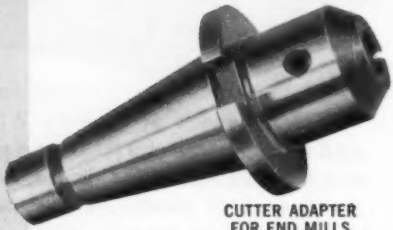

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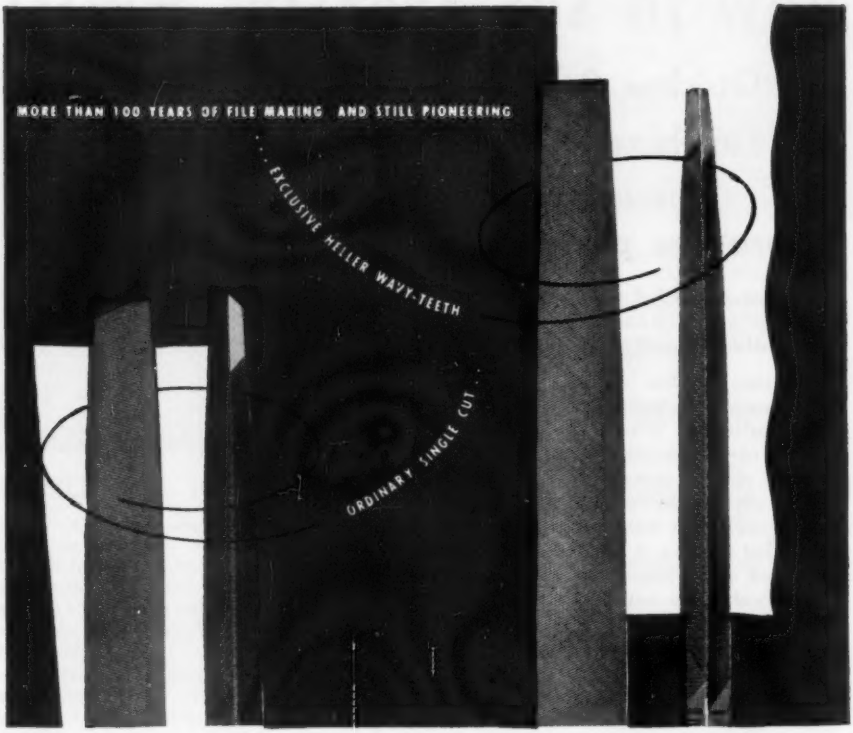

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You can remove more metal faster when you use Wavy-Teeth mill or saw files instead of ordinary single cut mill or saw files. Always specify "Wavy-Teeth" to get this exclusive Heller tooth arrangement . . . a typical development of Heller research. Through a continuous program of inspecting, testing and improving, Heller guarantees file users "the best."

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HOW TO BUY ABRASIVE WHEELS

For Quicker Roughing and Finishing on Welds

. . . and get "More Use per Dollar"

Look for a *molded* disc wheel that is specially made in a range of types to meet your particular application.

Make sure the disc you select is built to give long service under heavy duty grinding conditions. Where the abrasive is *molded throughout* the disc you get faster, cleaner cutting action down to the last usable part of the wheel . . . maximum abrasiveness that lasts for hours or days, instead of minutes. A molded disc exposes new and sharp grips with every turn of the wheel, does not become glazed or "loaded". For safe operation on the job, the molded disc should be reinforced with special super-strength fabric and held together with a shock-resistant bond to guard against breakage.

Look for a molded disc made available in a number of rubber or resinoid bond modifications to suit your specific job conditions . . . to give you the needed grinding flexibility to produce a better finish, more easily.

Specify the molded disc wheel engineered to give safe, fast cutting, long lasting service on your job . . . specify Manhattan Moldiscs.

MANHATTAN MOLDISCS

Manhattan Moldiscs are custom-made for your particular type of work on mild steels, stainless alloys, aluminum and copper weldments, castings or forgings. Actual tests have shown that Manhattan Moldiscs outlast 25 to 30 coated abrasive discs, plus additional savings in time and labor normally required for disc changes. They are safe to use because they are light in weight, easier to control and reinforced with special super-strength fabric to prevent breakage. Available types range from harder, stiffer bonds for fast roughing to more flexible or resilient bonds for fine finishing. Whatever your job requirements, Manhattan Moldiscs assure faster metal removal throughout the life of the wheel.

Ask your Manhattan representative to show you why Manhattan Moldiscs, like other types of Manhattan high speed, heavy duty wheels, last much longer . . . give you "More Use per Dollar."

RM-525 **WRITE TO ABRASIVE WHEEL DEPARTMENT**

MANHATTAN RUBBER DIVISION — PASSAIC, NEW JERSEY

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Manufacturers of Mechanical Rubber Products • Rubber Covered Equipment • Radiator Hose
Fan Belts • Brake Linings & Blocks • Clutch Facings • Packings • Asbestos Textiles
Engineered Plastic, and Sintered Metal Products • Abrasive & Diamond Wheels • Bowling Balls

Your Williams distributor has the Widest Selection of Carbon Wrenches!

31 PATTERNS...581 SIZES

For Every Wrench Application

Choose the Williams wrenches you need . . . and get them from *local* stocks in a hurry. Your Williams DISTRIBUTOR will supply you with practical, efficient, modern designs in the right sizes to meet your requirements.

All Williams carbon wrenches are drop-forged from strong carbon steel . . . fully heat-treated . . . and finished in black baked enamel with polished head faces. You can't buy better.

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you'll get SERVICE ON THE DOUBLE from your DISTRIBUTOR'S SALESMAN

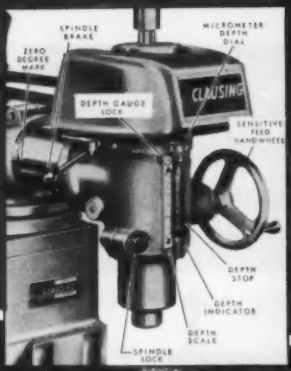
He'll give you quickest delivery at lowest cost!

WILLIAMS

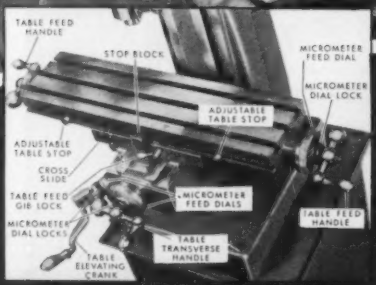
INDUSTRIAL TOOLS

"The Broadest Line of Its Kind"

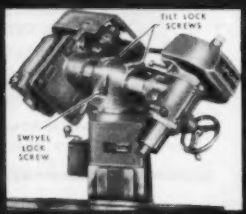
WHY



The *Heart* of the Clausing Mill is its rigid, high precision spindle head. It has 7 ball bearings — spindle is chrome nickel steel, hardened and ground — quill, ground and hard chrome plated, has honed bearing seats — overarm is an electric furnace casting, with ¾" thick walls precision ground. The Clausing is a "sensitive" machine you'll appreciate on those difficult jobs.



The CLAUSING Miller table, saddle and knee position smoothly and accurately. Table surfaces and all dovetail ways are precision ground . . . ways have gibs. Feed screws have ground threads, turn on ball bearings.



The spindle head can be swiveled in a vertical plane and set at any angle, and turret rotated in a horizontal plane making it possible to mill at all angles with one setup. Quill has micrometer depth control stop and two feeds, lever and hand wheel.

the new CLAUSING VERTICAL MILLERS are the busiest machines at

The new CLAUSING VERTICAL MILLER is a precision machine tool designed for jig, die and fixture making . . . pattern, experimental and tool-room . . . and general production milling. Many new, exclusive features give it greater versatility and ease of set-up and operation than have ever been available in a miller at or near its price.

And . . . *it is extremely accurate!* Every CLAUSING MILLER must pass rigid tolerance tests — such as:

1. **Top of table perpendicular to column ways, both directions, within .0005" in 8" travel.**
2. **Table top, front to back, square with column ways 0 to .001".**
3. **Table, parallel to turret within .001".**
4. **Spindle square with table, front to rear, within .001" T.I.T. in 5" circle.**
5. **Spindle taper (internal) run out within .0002" at spindle nose.**
6. **Table T-slots parallel to table dovetail ways within .0005" in 8" longitudinal travel.**

You'll be as enthusiastic as P-a-l Engineering with the performance of the new Clausing . . . and you'll be pleased, too, with its low cost and many operating economies. See it today at your CLAUSING dealer's!

MILLS, DRILLS, BORES, REAMS & SHAPES . . . AT ALL ANGLES . . . WITH ONE WORK SETUP!

P-a-l Engineering Ltd.

September 21, 1954

Atlas Press Company
1915-2023 North Pitcher Street
Kalamazoo, Michigan

Gentlemen:

We have recently purchased our fourth Clausing Vertical Miller and find it measures up to the finest machine standards.

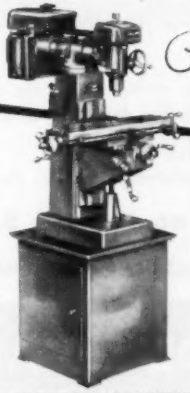
For standard precision, milling, drilling, boring, and location operations within capacity, it has no equal. We find the Clausing Vertical Mill the most versatile machine in our shop, and equal in performance and accuracy to several makes of higher-priced mills of which we have available.

The Clausing Vertical Mills are the busiest machines in our shop due to the variety of operations that can be performed and completed. For speed, convenience, accuracy and higher production at lower cost, it has no equal.

The Clausing Vertical Mill is the preference among our men for all milling machine work in its capacity because it is easier to work on, change set-ups, and it is consistently accurate.

PL/ms

Sincerely yours,
Paul Lebeda
Paul Lebeda



CONDENSED SPECIFICATIONS

Size of Table	6" x 24"
Longitudinal Table Travel	15"
Transverse Table Travel	5"
Vertical Table Travel	11 ⅛"
Maximum Distance Spindle to Table	11 ⅛"
Maximum Distance Spindle to Column	8 ¾"
Quill Travel	3"

Spindle Speeds: Six, 180 to 3250 R.P.M. — No. 7 Brown and Sharpe or No. 2 Morse Taper, Spindle Optional — Operates from ½ or ¾ HP, 1725 R.P.M. Motor.

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TURN PIPE DREAMS INTO PIPE BENDS

Pipe, tube and structural bending is now simplified with a PEDRICK PRODUCTION BENDER. Heretofore difficult bends, such as offsets and off-plane bends, can now be made in production quantities at an amazingly low cost. ALL PEDRICK PRODUCTION BENDERS are complete with motor, and are equipped with automatic duplicate bending relays.

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Prices start as low as $1575.00

(Motor and all Electrical Equipment included)

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measuring up

...and REX is the standard by which all high speed steels are compared

An older brother sometimes makes a handy yardstick for measuring junior's growth. And when it comes to tool steels, REX® High Speed Steel is – and has been for over 50 years – the standard of comparison.

There's no mystery to REX High Speed Steel. Its quality has been time-tested in thousands of shops. And after all, it's performance – not claims – that really counts. Make your *own* comparison test. Put REX High Speed Steel to work. Compare its structure, finish, hardenability, carbide distribution and general uniformity. You won't find another high speed steel that surpasses REX.

Remember, too, that even though it is widely distributed and used, REX High Speed Steel is made *only* by Crucible. So for tops in high speed steel performance, be sure you order the Crucible REX brand. *Crucible Steel Company of America, Henry W. Oliver Building, Pittsburgh 30, Pa.*

CRUCIBLE first name in special steels

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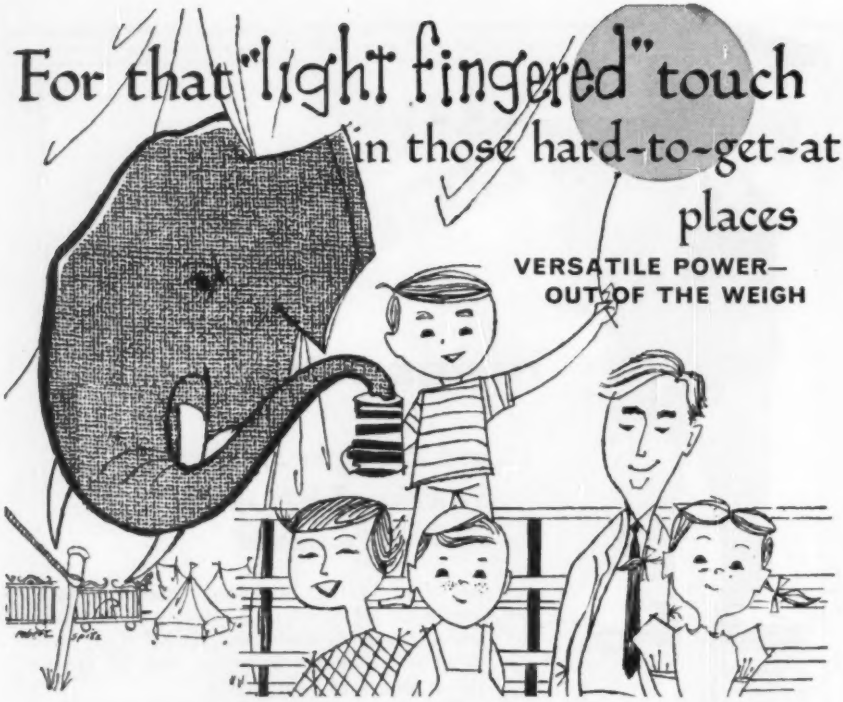
For that "light fingered" touch in those hard-to-get-at places

VERSATILE POWER—OUT OF THE WEIGH



Power with the light-fingered touch—for those hard-to-get-at places! Haskins Flexible Shaft Equipment lets the power do the job without burdening skilled hands with heavy motors. For every job of grinding, sanding, filing, polishing or buffing—from $\frac{1}{4}$ HP to 2 HP—Haskins tools increase production and cut costs. Two good reasons why you should write for the latest Haskins Catalog.

The Haskins line provides a wide variety of models with drives, horsepowers, speeds, tools and attachments—including the one assembly exactly suited for your particular job.

haskins

R. G. HASKINS COMPANY • 2645 W. HARRISON ST., CHICAGO, ILL.

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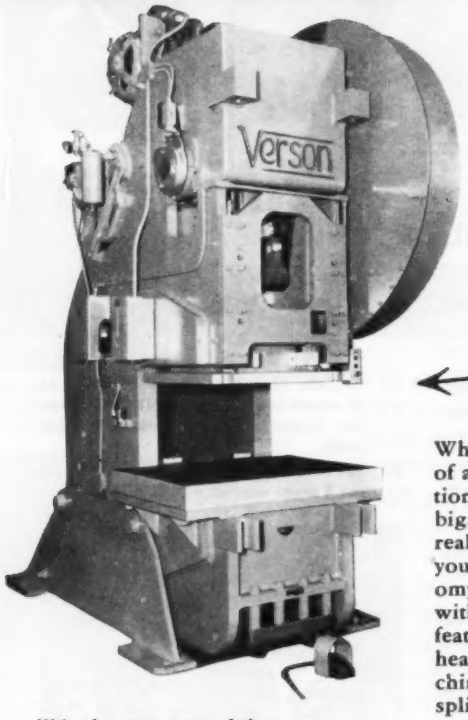
Verson

O. B. I.'s



When you can combine the versatility of an O.B.I. press with the construction and performance standards of big, expensive machines, you get a real production tool that will give you the best possible long term economy . . . And that's just what you get with Verson O.B.I.'s. Just check these features—gears running in oil . . . heavy all-steel welded frame . . . machine cut steel gear and pinion . . . split cap main and crankpin bearings . . . mechanically interlocked pneumatic clutch and brake unit . . . full electric controls . . . many others.

Write for your copy of the new Verson Open Back Press Catalog. It's just off the press.

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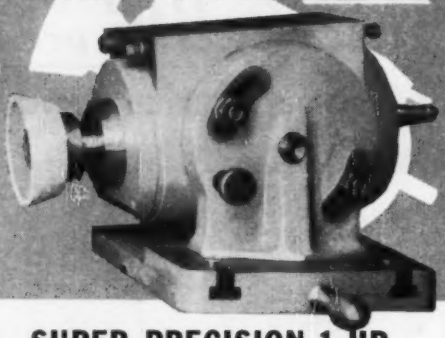
TOOLING • DIE CUSHIONS • VERSON-WHEELON HYDRAULIC PRESSES

HERE'S A HEAD THAT TILTS

and Yours Will Nod, Too When You See What You Can Do With This One

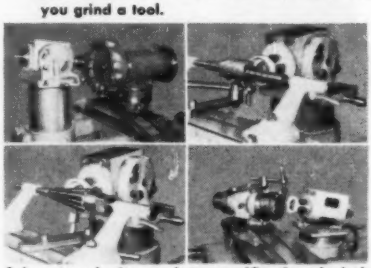


POPE SUPER PRECISION 1 HP, 3600 RPM MOTORIZED TOOL AND CUTTER GRINDER CLEARANCE ANGLE SWIVELLING HEAD

With Angular Adjustment In A Vertical Plane

Give this versatile head the nod and save time and money these seven ways:

1. You can use cup wheels for practically all clearance angles and thus produce a cutting edge on tools that lasts longer because it is stronger.
2. You can keep the tooth rest on the center line of the cutter for practically all grinding on centers or in the work head.
3. You can grind most cutters and reamers all over *with a single set-up* using the swivelling table and Pope tilting head.
4. You can read all clearance angles directly in degrees from the scale provided on the head. No more mistakes.
5. You can get the right clearance angle on such tough grinding jobs as slab mills, taper reamers, angular cutters and form tools.
6. You have one safe speed — 3600 RPM — for all wheels generally used on cutter grinders. Heat checking of cutters is virtually eliminated.
7. You have a head that's so easy to adjust and use it saves you time and money every time you grind a tool.



Ask us to submit complete specifications including price and delivery.

No. 101

Specify **POPE** PRECISION SPINDLES

POPE MACHINERY CORPORATION
Established 1920
261 RIVER STREET · HAVERHILL, MASSACHUSETTS

New Hancock CHUKOLLET can save you up to 90% in set-up time!

Eliminates making special jigs or fixtures for many of your intricate jobs!

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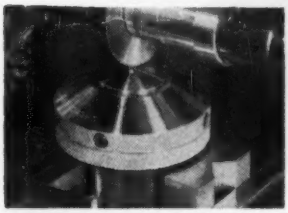
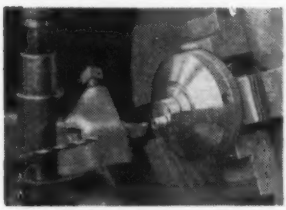


Part with irregular outside dimension is easily held in CHUKOLLET. Internal stop controls depth to .0005 inch.



CHUKOLLET set off center in 4-jaw chuck eliminating special fixture. Will machine consistently accurate eccentric parts with internal stop for positive axial location.

Hancock CHUKOLLET is easy to use and more versatile than any other collet chuck on the market... makes 5 C collets useful on every machine in the shop.

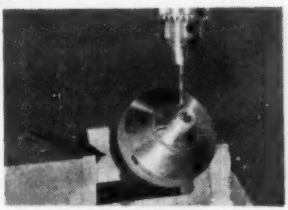
CHECK THESE FEATURES:

- Will not dislocate workpiece as collet *is not* drawn in while closing.
- Takes only a quarter turn to tighten or loosen workpiece.
- Holds soft-threaded and thin-walled cylindrical parts without damage for machining.
- Holds workpiece for intricate angular work.
- All critical dimensions finish-ground to instrument accuracy.
- Felt-sealed to keep dust and chips out.
- Made of Chrome-Moly Steel, hardened inside and out.

HANCOCK MFG. CO. Dept. BD, Santa Clara, Calif.

(Left) Hancock CHUKOLLET used for milling operation on soft threaded parts

(Right) CHUKOLLET can be used at any angle or compound angle



VK HIGH SPEED STEEL THREAD MEASURING WIRES

basic tools in a universally accepted method of checking screw threads

VK Set No. 20 HS Thread Measuring Wires, accurate to ± .000025" for 20 common pitch Unified and American screw threads, 6 to 36 threads per inch.

The Van Keuren Catalog and Handbook No. 35 contains 91 pages of technical and engineering information on wire measurement of screw threads. This information, compiled from many years' research in the field, is available without charge by addressing: The Van Keuren Co., 177 Waltham St., Watertown, Mass.

The three-wire method is probably the best known and most widely accepted system of measuring pitch diameter of screw threads. Equipment required includes only a set of VK Thread Measuring Wires of proper diameter and an accurate measuring instrument.

Van Keuren Thread Measuring Wires have been developed over a period of many years of pioneering in the precise measurement field. They are made to National Bureau of Standards specifications, are held within .00002" for roundness, straightness and identity and to within .000025" of exact size.

VK Thread Measuring Wires are made of long-wearing, tough and beautifully finished high speed steel and are either 1⅞" or 2" in length. Every wire is subjected to the closest criteria in today's standards of accuracy.

In addition to set No. 20, shown here, VK furnishes many other standard sets as well as special wires in diameters from .001" to 1.500".

VK

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THE Van Keuren CO.,

177 WALTHAM ST., WATERTOWN, MASS.

Light Wave Equipment • Light Wave Micrometers • Gage Blocks • Taper Insert Plug Gages • Wire Type Plug Gages • Measuring Wires • Thread Measuring Wires • Gear Measuring System • Shop Triangles • Carboloy Cemented Carbide Plug Gages • Carboloy Cemented Carbide Measuring Wires • Chrome Carbide Taper Insert Plug Gages.

BENRUS OBTAINS

***"WATCHMAKER'S PRECISION"* STAMPING**

with

PRODUCTO *Catalog* DIE SETS

By converting a Producto 2-pin catalog die set into a special 4-pin set, the Benrus Watch Company, Waterbury, Conn., were able to carry on this precise link stamping job economically, yet at no sacrifice of production speed or quality. The easily made conversion gave Benrus a small, compact, carefully balanced die set that lined up perfectly. The results, as indicated below, assured high-quality, high-speed stamping with a minimum of rejects and with extremely low per-hour and per-grind costs.

PART: "X-type" Expansion Bracelet.

STAMPINGS: Top and bottom links (or liner parts) supporting outer shells.

MATERIALS — TOP LINK: Type 430 steel, dead soft, bright finish.

BOTTOM LINK: 85-15 rich low brass, dead soft.

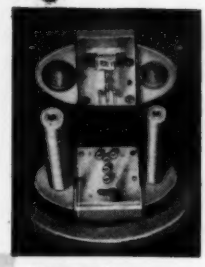
TOLERANCE: Hole Locations — Both top and bottom ± .0005".

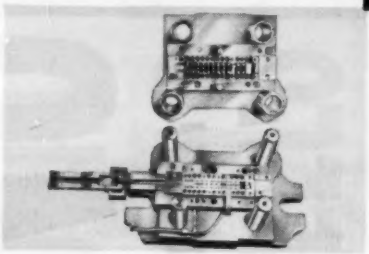
THICKNESS: Top — .018". Bottom — .030".

STATIONS: Top — 3. Bottom — 10.

PRODUCTION: Top — 6,000 pieces per hour. 50,000 pieces per grind.
Bottom — 6,000 pieces per hour. 75,000 pieces per grind.

OPERATIONS: Top — Pierce, pilot, blank.
Bottom — 6 draws, pierce, swedge, pilot, blank.





This special watchmaker die set, made by Producto to Benrus specifications, was used for stamping top links.

For Precision Die Sets *Fast* Call...

THE PRODUCTO MACHINE CO. 960 Housatonic Ave., Bridgeport 1, Conn.

ALSO MAKERS OF TOOL AND DIEMAKERS ACCESSORIES, VISES, MACHINERY

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COMPLETELY NEW

...A COMPLETE LINE!

V40

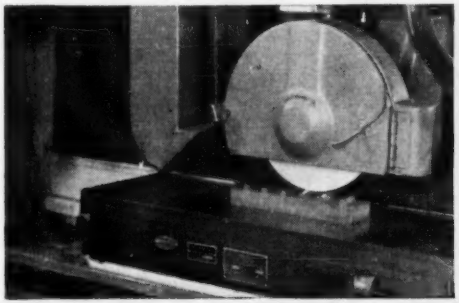
BOND

TOOL ROOM WHEELS

COMPLETELY NEW!
FASTER CUTTING...and COOLER CUTTING
Even heavy infeeds can be taken without burning the stock or overheating the tool.
GREATER FORM HOLDING ABILITY...yet EASIER, FASTER DRESSING
when required, because of the special new vitrified bond composition.

EASY TO ORDER! Grit for grit, grade for grade, these new wheels match your present specifications. *But*—see how the V40 Bond Wheel outperforms any other tool room wheel you are now using.

TRY ONE NOW! Call your CARBORUNDUM Distributor or Salesman (listed in the yellow pages of your phone book under "Abrasives" or "Grinding Wheels") for full details on these outstanding wheels. One trial will convince you! Write to The Carborundum Company, Dept. B. 81-412, Niagara Falls, New York.



A COMPLETE LINE OF WHEELS (Straight • Recessed • Straight Cup • Flaring Cup • Dish • Saucer) FOR EVERY TOOL ROOM

...continually putting more sense in your abrasive dollar

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81-412B

Heavy-Duty model also available

NEW KENDEX* tooling slashes cost per cutting edge

It's entirely new . . . everything except the long-established Kendex "throw-away button" principle pioneered and proved by Kennametal.

We took a good look at tool cost per cutting edge and designed a new Kendex with a clamp-on, "turnover" insert, plus a new system of chip control. This combination eliminates all regrinding, doubles the usable cutting edges per insert, and slashes tool cost on all types of machining operations. For example: on one job, tool cost was cut from $1.13 to $0.06 per piece.

NEW "TURNOVER" INSERTS. The new "turnover" inserts are designed with cutting edges on both sides, and can be indexed in seconds. After all cutting edges are used on one side, turn them over and use an equal number on the reverse side. Square inserts have eight cutting edges; triangular inserts, six.

These cost-reducing inserts are available in two types: (1) Regular, ground on top and bottom with corner radii ground for indexing; (2) Precision inserts, ground on all sides for precision indexing. When all edges are used . . . replace the insert and eliminate regrinding.

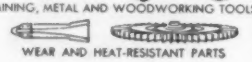
The new Kendex comes in a range of sizes in two models—Standard and Heavy-Duty. The Standard model is available with either Regular or Precision inserts; the Heavy-Duty with Regular inserts only.

NEW CHIP CONTROL SYSTEM. The new Kendex design not only eliminates regrinding of inserts, but the grinding of chip breakers as well. Standard Kendex tools have replaceable carbide chip breakers which have the widest effective application of any mechanical chip breakers available. On many jobs, the chip breaker can be removed to prolong tool life. Heavy-Duty sizes are fitted with rigid, inexpensive spring clamps which serve as chip deflectors.

Replaceable, hardened steel shims (available on the larger shanks) prolong tool life, reduce tool maintenance, and eliminate grinding of holders in case of accident with the tool.

For complete information, call your Kennametal representative, or write KENNAMETAL INC., Latrobe, Pa. A-27

*Registered trademark



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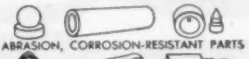

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LIVE CENTERS

Give You Custom-Engineered Performance . . . in Standard Models

. . . from DISTRIBUTOR STOCKS

MULTI-DUTY

Interchangeable male, female and pipe points for centered and uncentered work. Nine sizes; Morse tapers 1 through 5, as well as straight. Loads to 1500 lbs. at 100 RPM.

HEAVY DUTY

For close tolerance turning jobs to 22,000 lbs. at 50 RPM. Eccentricity less than .0002". Morse tapers 4, 5, 6 and 7.

Standardize on IDEAL Live Centers and meet practically any live center need right from distributor stocks! You'll simplify stocking, reduce inventory investment. Get top performance, too, as proved by the hundreds of plants where IDEAL Live Centers are *first choice* for unsurpassed quantity and quality of output—on *all* kinds of jobs. See your IDEAL Distributor or mail the coupon.

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Accuracy to plus or minus .0001". Unusually high load capacity up to 5200 lbs. at 50 RPM. Morse tapers 2, 3, 4 and 5.

NEW PIPE POINT LIVE CENTER

For heavy turning work on pipes and other large, hollow cylinders. Sizes range from 3" diam. to 7½" diam. Load capacities up to 22,000 lbs. Morse tapers 3, 4, 5, 6 and 7.

The Complete Line

Sold Through Leading Distributors

IDEAL Live Centers Are Also Available in Brown & Sharpe and Jarno Tapers

IDEAL INDUSTRIES, Inc. IDEAL

1441 Park Avenue, Sycamore, Illinois

Please send free catalog data on IDEAL Live Centers

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Company.....

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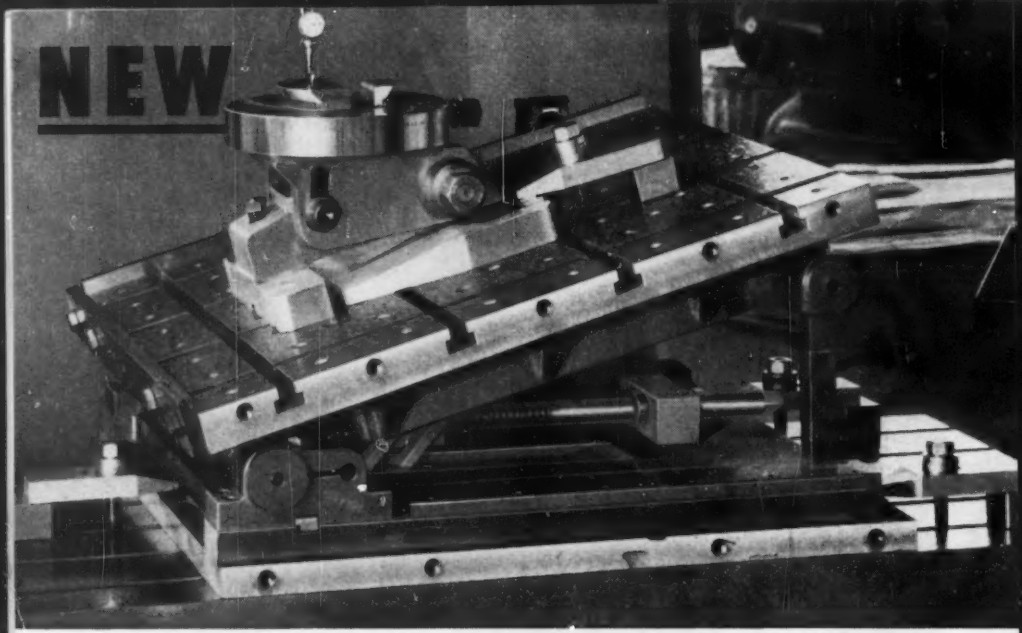
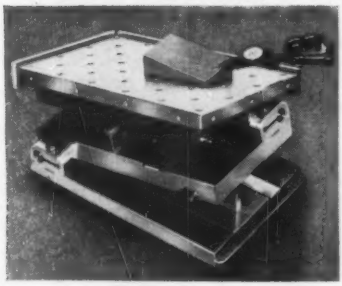
City.....Zone....State.....



Robbins SINE PLATE

WITH 24" x 24" WORKING AREA



Smaller Sine Plates are also available in models for both single and compound angles. Thousands are in daily use. Full details are in our illustrated catalog. Send for your free copy.

Designed on the sine bar principle, this husky new addition to the Robbins Sine Plate family provides gauge-block accuracy to angular set ups for very large, bulky work pieces. Any angle is quickly and accurately set up by inserting the correct standard gauge blocks between the top plate and the base of the unit.

In addition to the sturdy construction of these units, and to eliminate any possibility of dimensional inaccuracies due to distortion, gauge blocks are inserted at each side of the Sine Plate. Top plate is raised and lowered by a simple screw-type mechanism . . . positioning is simple, safe, sure.

Two of these Sine Plates used in combination also answer the need for any compound angle.

Complete information on these new extra-large Sine Plates or models built to specifications will gladly be forwarded upon your request.

OMER E. Robbins COMPANY

24800 PLYMOUTH ROAD • DEPT. A-4 • DETROIT 39, MICH.

Also producers of special gauges and fixtures

CHANGE CUTTERS WITH A

TWIST of the WRIST

TOOL UP WITH

CONTINENTAL DRIVE

CTW

With Continental Standard Drive Holders you can change cutters with a *twist of the wrist* no matter how severe the operation has been. This will save you time and save your tools.

It is as simple as this: The Continental Standard Drive consists of integral double driving lugs on the shank of the cutter which engage double abutments in the socket of the holder. Double aligning bearings keep the cutter and holder in rigid alignment. The drive is machined from the solid—there are no pins or loose details. Result—a balanced, positive drive which is non-wedging and practically indestructible.

Order through your Ex-Cell-O representative or direct from the Continental Tool Works in Detroit.

Continental Counterbores may be purchased individually or in sets. Write on your company letterhead for Catalog 60681.

Continental

TOOL WORKS

DIVISION OF

EX-CELL-O CORPORATION

DETROIT 32, MICHIGAN

53-6

HOW 6 MAJOR INDUSTRIES NOW CUT *Product Costs*

1 AIRCRAFT TUBING—Smooth, extra sharp bends now produced in ultra-thin stainless steel tubing, saves space and $14,000 per plane for aircraft manufacturer. Shown above, Pines Size 4 Unit forming wrinkle-free 8" c/l radius bend in 4" x .020" S. S. tubing.

2 HOLLOW TRACTOR BOOMS—Cold bending 12 ga. welded steel tapered tubes without distortion on Size 4 Pines unit eliminates expensive blanking and forming dies, saves tons of material for farm equipment manufacturer.

3 EXTRUDED WINDOW FRAMES — Part of production line setup in large aluminum fabricating plant, this small Pines Semi-Automatic saves space, accurately bends automobile window frame moldings.

4 REFRIGERATION AIR CONDITIONING ELLS — Special Pines Automatic Cut-Off Benders now produce copper ells and return bends at speeds up to 1500 per hour, reduce scrap losses to 1%.

with PINES PRODUCTION BENDERS

The examples shown here are a few of the countless number of production jobs that are now handled efficiently and more profitably on Pines Automatic Benders. They illustrate the versatility and the many cost-cutting advantages of cold forming round, square, rectangular, extruded, or hollow stock the "Pines-Way". Simplicity of tooling, uniform accuracy, and ease of operation are proven features of Pines machines which today help hundreds of plants cut product costs. At Pines you'll find an unmatched wealth of bending experience and creative tooling skill readily available to help you develop better methods and save time on production problems.

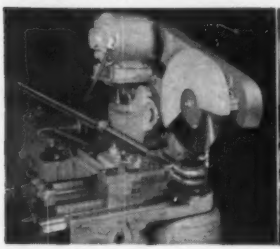
Write for *Free* **data sheets**

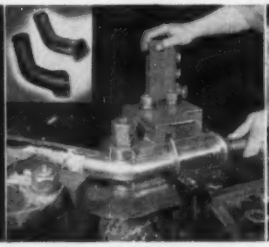
To keep abreast with latest developments in bending, write for copies of "Pines News" —bi-monthly mailing piece that gives facts on new, cost-cutting bending applications.

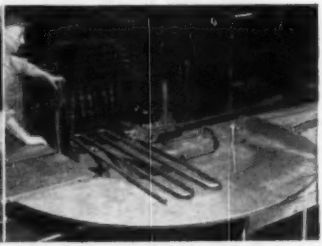
PINES ENGINEERING CO., INC.
Specialists in Tube Fabricating Machinery
692 WALNUT • AURORA, ILLINOIS

5 ENGINE MANIFOLD TUBES—Shed 1¼" O. D. steel tube now bent to 1½" c/l radius with flange attached saves space, insures accuracy, cuts costs.

6 BOILER TUBE AND REFRIGERATION COILS — Typical setup bending continuous serpentine coils from ⅜" steel tubing. Reduces welding, fabricating costs. Other installations range from ¼" copper up to 3" steel tube.

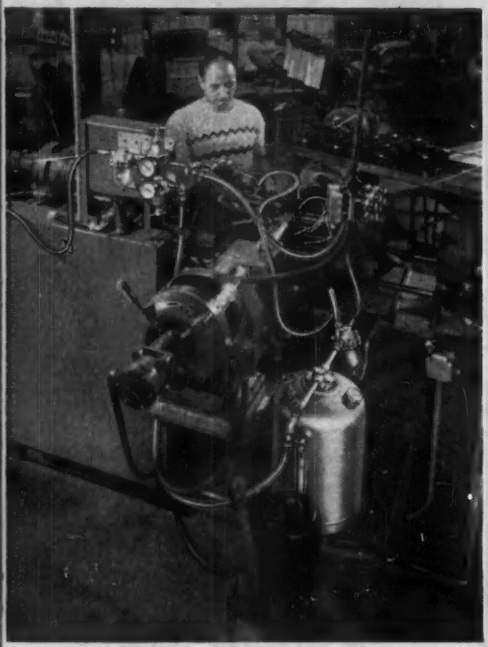






Norgren

Spray-Lube System



- increased tap life
- increased tapping speed
- eliminated problem of chips plugging coolant lines
- eliminated messy condition of splashing coolant

for

A-P CONTROLS CORP.

Machine taps 12 holes of various sizes simultaneously. Norgren Spray-Lube System includes 4½ gal. tank, 12 mixing valves and spray nozzles. Air and fluid line pressures are 42 psi and 44 psi respectively.

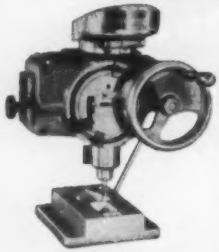
FOR COMPLETE DETAILS WRITE FOR NORGREN BLUEPRINT NO. SL-4

C. A. Norgren® CO.
3438 So. Elati, Englewood, Colo.

SEE OUR EXHIBIT... AT THE PLANT MAINTENANCE SHOW
Chicago, Jan. 24-27 • Booth 314

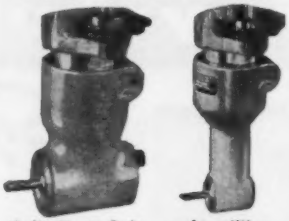
VALVES • FILTERS • HOSE ASSEMBLIES • REGULATORS • LUBRICATORS

Right Angle Attachments

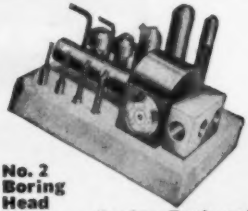


Cherrying Attachment

Makes possible production of convex and concave shapes. Ideal for producing drop forge dies, molds, cavities, metal core boxes, etc.

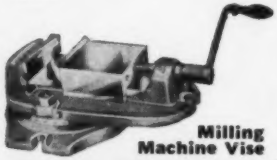


(Left) Heavy Duty . . . for milling and drilling at right angles; fits both Master and 1 HP Bridgeport Heads. (Right) Light Duty . . . for right angle milling and drilling narrow, deep molds and cavities.



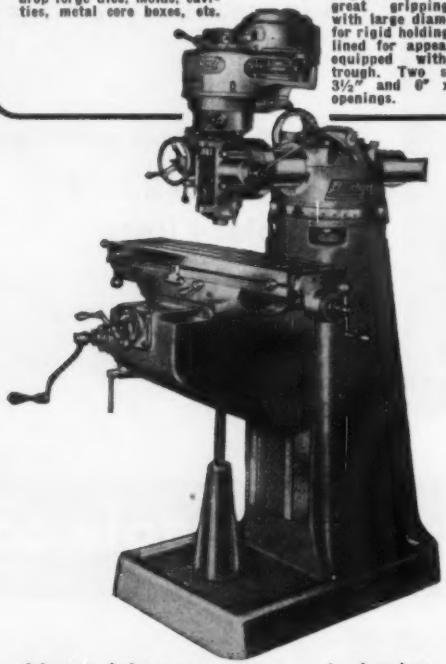
No. 2 Boring Head

Boring Tools and Holder provide means for boring holes up to 6" diameter; available for use on Bridgeport 1 HP Milling, Drilling and Boring Attachment.



Milling Machine Vise

improved and providing great gripping power, with large diameter screw for rigid holding. Streamlined for appearance and equipped with coolant trough. Two sizes: 5"x 3½" and 6" x 5" jaw openings.



A Few of the Attachments Available

Bridgeport

TURRET MILLING MACHINE'S ATTACHMENTS

add unprecedented versatility in productive ability

"Bridgeport Millers" in themselves are universally recognized as machines of outstanding utility. Their **exclusive method** of being able to drill, bore and shape over a wide area without changing set up, has contributed much to their universal acceptance through the convenience, economy and accuracy offered. But this is not the whole story. . . .

Note the attachments shown above. Here are a few means developed by "Bridgeport" engineers to go still further in extending the versatility of these machines . . . attachments which mean not only greater convenience but which vastly extend the operations which can be performed . . . attachments which will enable **one** machine to do the work of **several** single purpose machines. Furthermore, many more jobs can be assigned to the "Bridgeport" with the result that many more productive hours are available from **one** machine.

Ask your dealer . . . or us . . . . to show how you, too, can apply Bridgeport Attachments to extend the utility of your machines. Ask also for literature on Bridgeport Turret Milling Machines.

Bridgeport MACHINES, INC.

Bridgeport, Connecticut

Manufacturers of High Speed Milling Attachments and Turret Milling Machines

How should I buy machine tools?

Outright purchase?

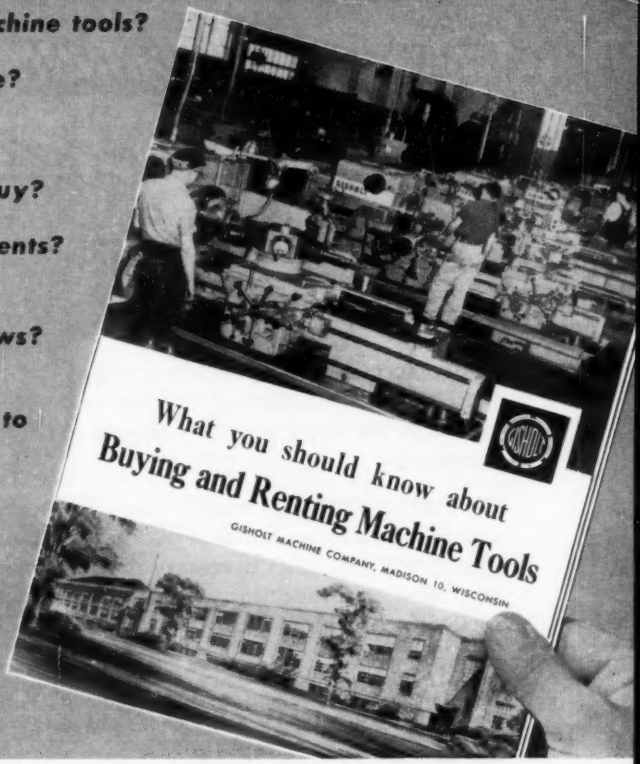
Should I Lease?

Lease with option to buy?

Buy on extended payments?

What about the new tax laws?

How can I know <u>when</u> to replace machines?



This New Gisholt Bulletin Will Help You

Recently, a lot of things have been happening which tend to confuse the outlook for buyers of machine tools and other industrial equipment. So Gisholt prepared this booklet to deal with the most important of them. The aim is to help you find the wisest answers in your particular case.

The booklet discusses leasing and time payment plans, makes cost comparisons, discusses depreciation under the new tax codes, replacement programs and the MAPI formula for machine replacement. A copy of this booklet is yours for the asking. No obligation, of course. Use the coupon.

GISHOLT MACHINE COMPANY

Madison 10, Wisconsin

The Gisholt Round Table represents the collective experience of specialists in the machining, surface finishing and balancing of round or partly round parts. Your problems are welcome here.

TURRET LATHES • AUTOMATIC LATHES
SUPERFINISHERS • BALANCERS • SPECIAL MACHINES

Gisholt Machine Company 1221 E. Washington Ave.
Madison 10, Wisconsin

Gentlemen:

☐ Please send me a copy of your new booklet on extended-payment and leasing plans.

☐ Please have a Gisholt representative call on me.

Name.....*Title*.....

Company name.....

Street address.....

City.....*Zone*.....*State*.....

Tough grinding jobs?

Check *Vulcanaire* high speed precision grinding heads!

Grinding circular slo using Vulcan's Rotar Table and Magneti chuck.

Many seemingly impossible grinding problems have been solved by adapting Vulcanaire to standard machines or by using one of Vulcan's specially designed machines.

On Surface Grinders, merely remove wheel and guard, clamp vertical or horizontal adaptor to machine as illustrated. No belts necessary. For instance, Vulcanaire used in connection with Vulcan's Rotary Table for Surface Grinders permits the grinding of a circular slot.

Vertical adaptor for Sur face Grinders. Grindin small slots

Adaptors are in stock to fit the spindle of Vertical Milling Machines for grinding contours, holes and slots.

On Internal Grinding Machines Vulcanaire's infinitely controlled speeds furnish the correct surface cutting speed resulting in faster production and micro finish. The adaptor sleeve fits into present housing.

Applied to Jig Boring Machines, Vulcanaire is liked by leading precision manufacturers because its accuracy is guaranteed, producing Vulcanaire jig grinding of large and small parts.

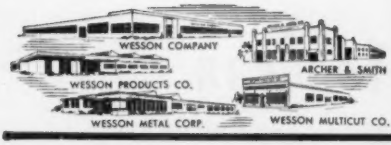
Send us a blue print on your toughest grinding problem. Recommendations and sketches will be returned to you — no obligation.

Horizontal application Grinding a shoulde Punch.

Major Vulcan Services

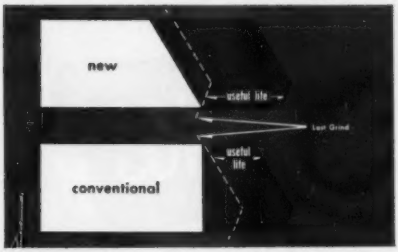
Engineering, Processing, Designing and Building . . . Special Tools . . . Dies . . . Special Machines . . . including the Vulcan Hydraulics that Form, Pierce, Assemble and Size . . . Vulcanaire Jig Grinders . . . Vulcan Motorized Rotary Tables . . . Plastic Tooling . . .

VULCAN TOOL CO. HIGHLAND AND LORAIN DAYTON 10, OHIO



carbide NEWS

Carbide Tip Waste Cut 30%



Wesson milling cutter blade design has base parallel with peripheral cutting edge; permits more regrinds per blade

Reduction in carbide waste is assured by the new milling cutter blade, at top, since base of carbide tip parallels the peripheral cutting edge. Conventional blade is shown below.

A new carbide-tipped milling cutter blade design now incorporated into the Wesson Rigidicut milling cutter line is producing an increase of 30% or more in blade life.

Tipped with Wessonmetal carbides, the new blade permits maximum carbide usage and enables many more regrinds per blade.

The new blade design is compared with old style blades in the sketch at the left. In the new blade, the base of the carbide tip is parallel with the peripheral cutting edge, eliminating waste.

Because of the success of the new design in extensive field application tests, it is now standard in most Rigidicut cutters in the fine pitch and coarse pitch series. Additional economy results since these blades are being made available at no increase in price.

Complete engineering data and price information on the entire Rigidicut milling cutter series is available from Wesson Company, Dept. AD, 1220 Woodward Heights Blvd., Detroit 20, Michigan.

Wesson Metal Now In Top 3

With the official opening recently of a new and modern carbide plant in Lexington, Ky., Wesson Metal Corporation entered the ranks of the three largest carbide manufacturers in this country. A model of scientific design, the new Wessonmetal plant occupies over 40,000 square feet of manufacturing space.

In the new plant, greatly expanded research and development facilities will highlight continued development of new carbide metal-cutting grades. The company's quality control laboratories contain some of the most advanced scientific equipment available.

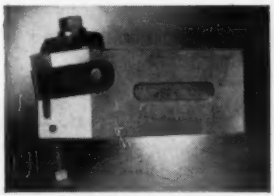
The new plant, which houses some entirely new manufacturing and quality control developments, will more than double the productive capacity of previous facilities. Working at virtually full capacity already, the new plant is keeping pace with wide-spread demand for the complete line of Wessonmetal carbides.

A substantial portion of the plant's capacity is being devoted to output of the latest Wessonmetal development in steel cutting grades. The new steel cutting grade promises to be the most significant carbide development since the introduction of steel cutting carbides.

New Multicut Holder Gets Peak Efficiency From Fischer Lathes

Popularity of the Fischer copying lathe springboarded the development of a special band-type Multicut tool holder. Coupled with the steel band used on all Multicut holders is a new top clamp that assures rigidity of insert when the tool is recessing or going through the out-facing cycle.

Combination of band and clamp permits closer tolerances and finer finishes in the complete range of Fischer lathe applications. Finish turning is eliminated in many operations. The holder uses standard Wessonmetal D-55 inserts.



Closer tolerances and finer finishes result from band and clamp used in Multicut holder.

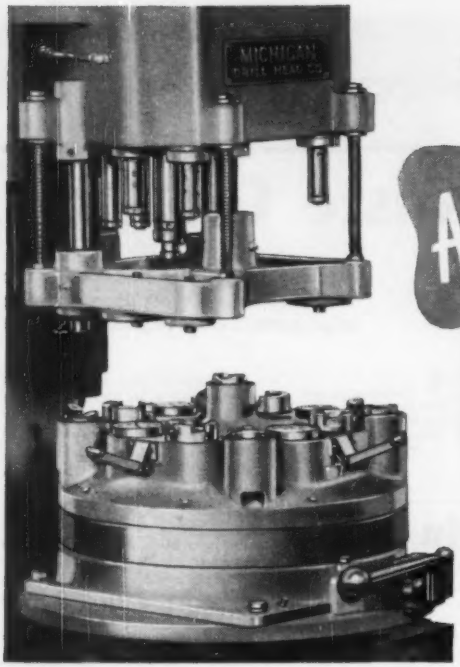
CARBIDE DATA

Additional information and specifications available:

- ☐ 121 page catalog covering complete standard and special Rigidicut milling cutter and blade line.
- ☐ Specification-Data Sheet on special Multicut holder.

Get data by writing to:
WESSON COMPANY, Dept. AD,
1220 Woodward Heights Blvd.,
Detroit 20, Michigan

tools carbide Wessonmetal



You can do AMAZING THINGS on a small drill press

YES you can drill, ream and finish bore pressure plates for hydraulic pumps, on the drill press pictured above.

Here's a nine spindle drill head bushing plate and fixture and, a four-station hand operated index table—mounted on a Michigan Hydro 3 Drill Press. It's really amazing!

We also invite your inquiries as to our line of tapping units, and index tables—both manual and automatic—catalog sent on request.

Michigan DRILL HEAD CO. Detroit 34, Michigan

engineers and manufacturers of production machines and drilling equipment

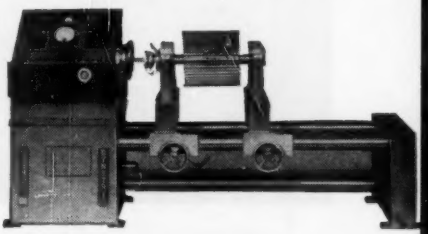
the final *check* for every rotating part...

Maybe it's a crankshaft or an armature . . . perhaps a fan or a belt pulley. No matter. The important thing is this: If it isn't *balanced*, it isn't ready for service.

Smooth operation and long life require that accurate static and dynamic balance be rated right along with mechanical specifications to assure the efficiency of the finished product.

Gisholt Balancing Machines can locate and measure unbalance vibrations down to .000025" with simple readings . . . handle any assembly from ½ ounce to 50 tons.

The cost? Very moderate. Let Gisholt Balancing Machines provide the final check. Write us.



The Gisholt Type 3U Balancer shown here is capable of balancing rotating parts or assemblies weighing from 50 to 1000 pounds. Other sizes and types are available to answer any balancing problem. Gisholt Balancers can also be furnished with correction equipment to meet your own specific requirements.

THE GISHOLT ROUND TABLE *represents the collective experience of specialists in the machining, surface-finishing and balancing of round and partly round parts. Your problems are welcomed here.*

GISHOLT MACHINE COMPANY

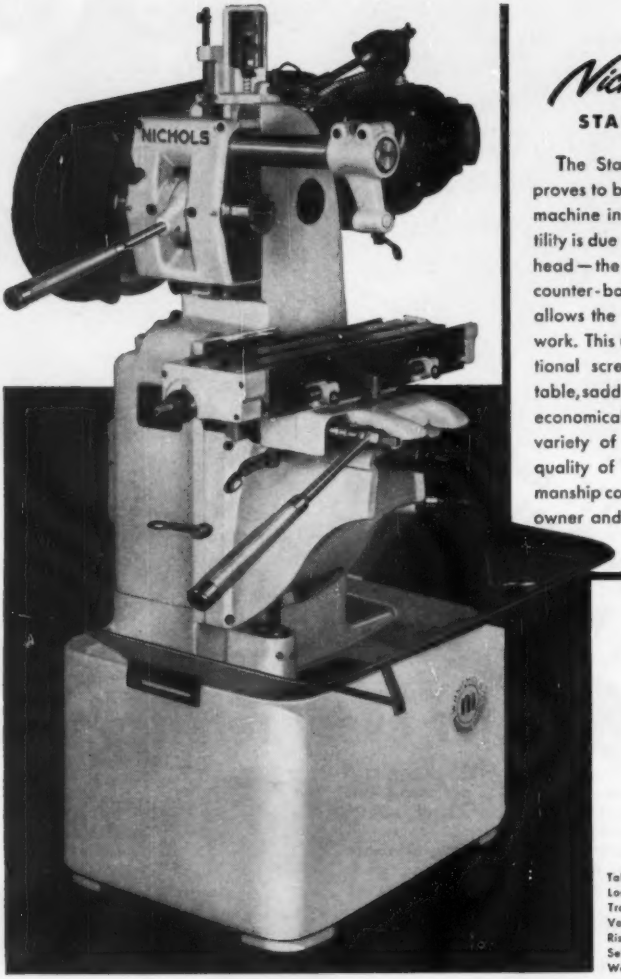
Madison 10, Wisconsin

DYNETRIC BALANCERS

GISHOLT

DEVELOPED JOINTLY WITH WESTINGHOUSE ELECTRIC CORPORATION "DYNETRIC" IS A TRADE MARK REG. U. S. PAT. OFFICE BY WESTINGHOUSE ELECTRIC CORPORATION

TURRET LATHES • AUTOMATIC LATHES • SUPERFINISHERS • BALANCERS • SPECIAL MACHINES



Nichols Miller

STANDARD MODEL

The Standard Nichols Miller often proves to be the handiest (and busiest) machine in the shop. Its unusual versatility is due to the "rise and fall" spindle head—the spindle being mounted in a counter-balanced sliding head which allows the cutter to be brought to the work. This unique feature, plus conventional screw or lever movements of table, saddle and knee, guarantees fast, economical production on the widest variety of parts. And the unexcelled quality of Nichols' design and workmanship commands the respect of every owner and operator.

"the miller that uses its head!"

CONDENSED SPECIFICATIONS

Table Working Surface	6¾" x 21" or 30"
Longitudinal Travel	10" or 19"
Transverse Travel	7"
Vertical Travel—Knee	13½"
Rise and Fall of Spindle	4½"
Selective Speed Ranges up to 5000 R.P.M.	
Weight	1250 lbs.

Write today for the Nichols general catalog, which describes the six models of Nichols Millers. A sound, color movie, "the Miller that Uses its Head" is available for free showing. May we reserve it for you?

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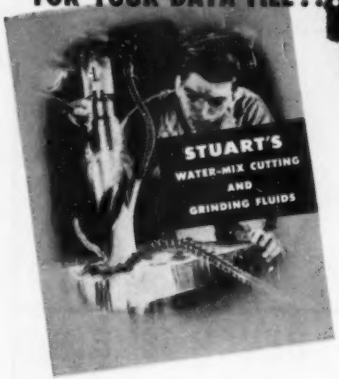
NATIONAL DISTRIBUTORS **NICHOLS-MORRIS CORPORATION** 76-G Mamaroneck Ave White Plaines, N. Y.

FOR YOUR DATA FILE . . .

a *NEW GUIDE* to SOLUBLE OIL SELECTION



Every industrial lubricant is measured by its performance. Water-mix cutting and grinding fluids are no exception . . . it still takes the *right* oil to do the *best* job!

Stuart Oil Company's guide on water-mix cutting and grinding fluids is intended as a help when you're selecting a water-mix for the shop. It provides information and background on water-mixtures that you should know.

"The Man in the Barrel," your Stuart Representative, will be pleased to provide further information and help. Send for your book today.

DASCO

Two water-mixes built into one. Dasco Super Soluble Base is a heavy-duty water-mix cutting and grinding fluid of unusual versatility. Superior performance is provided in mixtures of 1-40 and higher for turning, milling, reaming, drilling and boring and 1-100 and higher for grinding.

KLEENKUT

A *conventional* type soluble oil to perform such jobs as light milling, turning, drilling, boring and others. Kleenkut provides something *extra* with more uniform performance, better stability, detergency, emulsibility and high anti-rust value.

SOLVOL

An emulsified heavy-duty cutting oil that is especially effective on the more severe applications where ordinary type soluble oils fall short of meeting tool life and finish requirements. Solvol provides a balance of cooling and lubricating value rarely equaled in a water-mix product.

CODOL

Stuart's water-mix liquid grinding compound that has been specially designed to reduce wheel loading. It provides adequate heat dissipation, anti-rust protection and a carefully balanced surface tension to carry away chips and abrasive particles.

More than a "Coolant" Is Needed

D. A. Stuart Oil Co.
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ECONOMICAL
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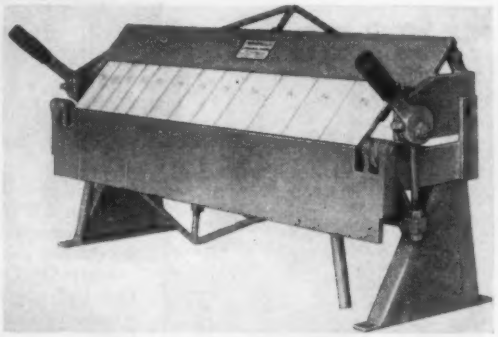
only $148.50

MODEL U322



CONNECTICUT UNIVERSAL BENCH BRAKE

Ideal for Experimental, Instrument, Electronic and Maintenance Work.
For short run production of boxes, pans, chassis, frames, etc.
Rated capacity: ⅜ flange on 22 gage mild steel; 3" box and pan depth.

Full details in Bulletin U322B.

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41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120
121	122	123	124	125	126	127	128	129	130	131	132	133	134	135	136	137	138	139	140
141	142	143	144	145	146	147	148	149	150										

Please Print

Company .....

Name ..... **Position** .....

Street .....

City ..... **Zone** ..... **State** .....

Please send information on the products or services mentioned or advertised on the following pages: ....

....

Please send information on NEW PRODUCTS described on the following pages:

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Please Print

Company .....

Name ..... **Position** .....

Street .....

City ..... **Zone** ..... **State** .....

USE THESE POSTAGE FREE ACTION CARDS Jan. 1955

selected for service

GAGE SELECTOR

NET PRICE SELECTORS

For the convenience of cutting tool and fixed gage users and buyers Threadwell presents two more services for more efficient and economical production:

NEW THREAD GAGE SELECTOR—a complete pocket-size tabulation of basic data for thread plug and ring gages, both fractional and numbered sizes from No. 0 to 1½".

NEW NET PRICE SELECTORS—provide quick data on all standard taps, dies, tap and die kits, counterbores and keyway broaches; simply pick the size and style wanted and get the net price instantly.

Ask your Threadwell distributor for these two new members of the Threadwell service family. Ask him too about the long service life of Threadwell's fine cutting tools and gages.

ADJUSTABLE ROUND, 2-PIECE & HEXAGON DIES

KEYWAY BROACHES & SETS

COMPLETE LINE OF HIGHEST PRECISION GAGES

THREADWELL DISTRIBUTORS, too, are strategically located to serve you promptly, properly, and well.

THE FINEST IN CUTTING TOOLS & GAGES

VIKING *Presents*

MULTIPLE-EDGE *THROWAWAY* CARBIDE INSERTS

FOR SINGLE POINT CUTTING TOOLS

COMPARE these exclusive features

Adjustable mechanical chip breaker!
Hardened, replaceable anvil!
Positive *or* negative rakes!
Lowest cost per cutting edge!

NOW IN STOCK

Triangular and square inserts.
Styles A, B, G.
Standard Shank Sizes #12, 16, 54, 64, 85, 86.

Viking TOOL CO.

ASK FOR BULLETIN #54

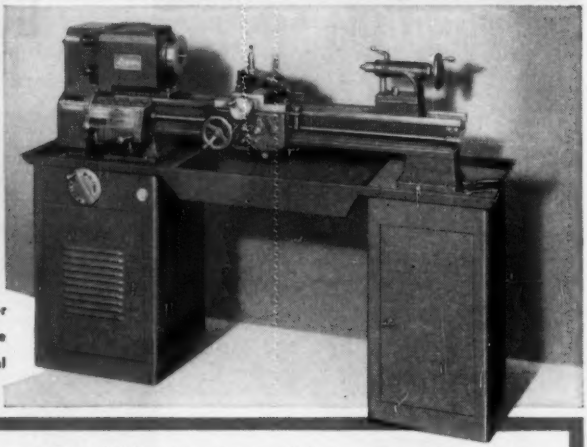
Have you received our new 44-page Tool Catalog?

NICHOLS ROAD SHELTON, CONN.

THE "2500" SERIES Logan 12" SWING LATHES

- 12" swing over bed
- 7¼" swing over saddle
- 1⅛" spindle hole
- 1" collet capacity
- 23" and 35" centers

Variable Speed Drive or Standard Double V-Belt Drive optional



Precision Built, Extra Heavy For Smooth, Powerful, Quiet Operation

Seeking ways to build better lathes is one project Logan never finishes. Now, in the "2500" series, Logan's continuous improvement program has produced a smoother running, more rugged line of 12" lathes. Extra strength is distributed through wider gears, larger shafts, heavier bearing supports, heavier base and at other points where more weight means more power, more smoothness and a minimum of vibration.

Advanced design and more precise construction are in evidence throughout these improved lathes. The precision carriage rides on a two-V-way, two-flat-way bed that is rugged, rigid, precision-ground and warp-free. The massive special alloy spindle turns on a double-row of over-size ball bearings. No bearing adjustment is needed for any spindle speed within the wide rpm range. The result is sustained accuracy as well as smooth, quiet operation.

Offering economy in price and in operation, plus quality in results, the "2500" series lathes can well put new profits in most of your metalworking. Your Logan Lathe dealer has them. See them now.

LOOK TO LOGAN FOR **BETTER** LATHES AND SHAPERS

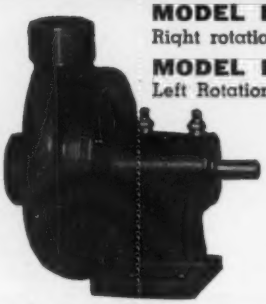
LOGAN ENGINEERING CO.

Lawrence and Lamon Avenue, Chicago 30, Illinois

NOT TOO LITTLE...
NOT TOO MUCH...BUT
JUST ENOUGH
COOLANT

TRADE MARK "FULFLO" REG. U.S. PAT. OFF.

CENTRIFUGAL COOLANT PUMPS



MODEL FRS4
Right rotation
MODEL FLS4
Left Rotation

Direct connection:

1800 to 2400 rpm; 35 gal. at 1725 rpm; 20-ft. head; also with pulley for belt drive if desired

1. Be sure you're using the right type of coolant . . .

2. Bring it to the right spot, pumped and circulated by the FULFLO PUMP designed for the purpose. That's good, sound engineering advice on how to KEEP TOOLS COOL AND MAKE THEM LAST LONGER.

Direct or motor drives: capacities ¼ hp 25 gpm to 1 hp 90 gpm; pipe sizes ⅜" to 1½".
Let the FULFLO engineers help. Write (on your letterhead, please) for your professional copy of

FULFLO MECHANICAL DATA BOOK

TRADE MARK "FULFLO" REG. U.S. PAT. OFF.

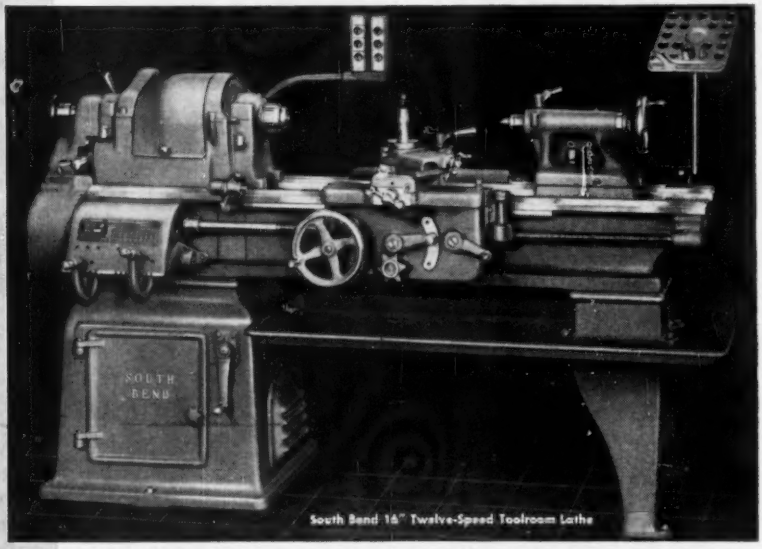
THE FULFLO SPECIALTIES CO. Inc.
BLANCHESTER, OHIO

Cuts Machining Time

The wide range of spindle speeds on this new lathe cuts machining time because the operator quickly selects the right speed for each operation. Pushbutton control provides a fast change from any high speed to the corresponding low speed. This versatility is further increased by 48 choices of longitudinal and cross feeds which insure maximum efficiency on every job.

SOUTH BEND 12 SPEED LATHE

CL8155C, illustrated below, f.o.b. factory, less motor and controls. Time payment terms available. **$2690.00**



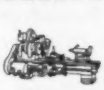
South Bend 16" Twelve-Speed Toolroom Lathe

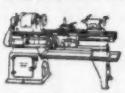
SPECIFICATIONS

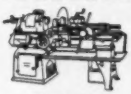
Spindle Speeds (approx.) Direct: high range 300, 550, 945; low range 150, 278, 475. Back gear drive: high range 32, 70, 118; low range 20, 33, 60.
Spindle Bore — 1⅜".
Swing over bed and saddle wings — 16¼".
Swing over saddle cross slide — 9⅝".
Distance between centers — 33¼", 45¼", 57¼", 81¼", 105¼".
Collet Capacity — 1" maximum.
Longitudinal Feeds — 48 R.H. or L.H., .0015" to .0841".
Cross Feeds — 48, .0006" to .0315".
Thread Pitches — 48, 4 to 224 per inch.

SEND INFORMATION CHECKED:

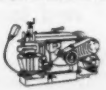
☐ _____
☐ TOOLS & ATTACHMENTS


☐ 9" and 10" BENCH LATHES


☐ 10" to 16-24" FLOOR LATHES


☐ ½" and 1" Collet TURRET LATHES

☐ 14" DRILL PRESSES


☐ 7" BENCH SHAPERS

Name _____ Company _____
Street _____ City & State _____

Building Better Tools Since 1906 • **SOUTH BEND LATHE** • South Bend 22, Indiana

DRILL ACCURATELY

at *ANY* angle

with an

OERLIKON

UNIVERSAL DRILLING MACHINE

MODEL UB2 IS BOTH PERMANENT AND PORTABLE

. . . 3 SPEEDS, 8 FEEDS, BUILT-IN MOTOR

An excellent stationary drill for precision work when a compound table is used to position jobs. However, the table may be removed—in fact, the column itself can be unbolted from the baseplate and fixed to a special base. The radial arm swivels in a full circle horizontally and the head turns to any angle in the vertical plane. Vertical settings are indicated on a graduated scale. Column, sleeve, and arm are rigidly held in position at any angle by lever controlled locking device. Thus, drilling or boring of large, wide or otherwise awkward pieces is simplified.

Workspindle with No. 3 Morse taper is chrome-molybdenum steel; nose and taper socket are flame hardened. Male thread on nose permits attachment of chuck, holders for boring bars or other special tools. Capacity for iron: 1 in.—steel: ¾ in.

Write for details or ask a representative to call.

COSA — *nationwide sales and service of precision machine tools —from bench lathes to boring mills.*

COSA CORPORATION, 405 LEXINGTON AVENUE, NEW YORK 17, N.Y.

ATRAX IN ACTION

RECORDS SHOW 500% INCREASE IN PRODUCTION WITH IMPROVED BORING TOOL BIT

A CASE HISTORY: One of our customers had experienced considerable difficulties in boring tapered holes in stainless steel. The specifications called for extremely close diameter and taper tolerances, and a finish requirement of ten micro-inch. The carbide tool previously used gave the customer a production of one piece part, containing eight holes, per eight-hour day. With the new Atrax superior finish ground boring bit, production increased to about five piece parts per day. One tool bit roughed out and finished eight holes before resharpening was necessary, and the finished product was eight micro-inch or better. Atrax Solid Carbide Tool Bits improved production in this instance by over 500%.

Possibly our engineers or sales representatives can help YOU achieve similar savings. You'll find them in all principal cities, ready to consult without any obligation.

NEW! Complete 88-page Manual and Catalog of Carbide Tools. Write for your free copy.

THE ATRAX COMPANY NEWINGTON 11, CONNECTICUT

More

CAPACITY
...VERSATILITY
...RIGIDITY
...ACCURACY*

More for your money in the new

U. S. VERTICAL MILLING MACHINE!

U. S. Vertical's balanced rigidity is the key to profitable production. Make the same comparison made by hundreds of plants. See why they find the U. S. Vertical to be the low-cost mill they demand. New "U. S." features include hard chrome plated quill, precision honed head and overarm bosses; and a quick change collet draw bar. Write today for complete details.

The U. S. Burke Machine Tool Division,
1 Brotherton Road,
Cincinnati 27, Ohio.

*Accuracy Certified! Check list showing results of actual inspection tests accompanies each machine.

Compare

FEATURES

- Balanced head and motor
- Simplified belt-speed changing
- Conveniently located reversing switch
- Protected knee gearing
- Lubricated-sealed ball bearings
- Built-in spot light
- Swing-out Tool-Keeper
- Guaranteed close tolerances*
- Hardened and ground lead screws (optional)

Compare

SPECIFICATIONS

	U. S. VERTICAL
Table Size	9½" x 36"
Longitudinal Feed	24"
Cross Feed	9¾"
Knee Travel	16½"
Quill Travel	5½"
Dovetail Depth	1¼" x 1½"
Vertical Screw	1⅜" dia.
Weight	1600 lbs.
Table Power Feed	0" - 12" per min. (infinitely variable)

CHECK THESE AGAINST ALL COMPETITION!

Compare

DELIVERY, too!

. . . our new plant addition permits us to promise and fulfill prompt deliveries.

THE U·S·Burke MACHINE TOOL DIVISION

Try these lightweight...speedy

PORTABLE TOOLS

● Produced in the industry's most modern, air-conditioned plant to give you *top precision.*

● Gives you advanced features for *faster production, easier handling.*

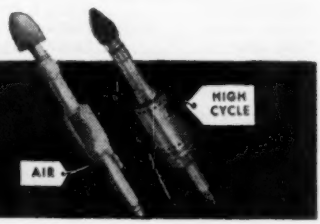
● Backed by Rotor Tool's 25-year reputation for applying the *right tool for your job.*

Ask for a demonstration of any of these tools.

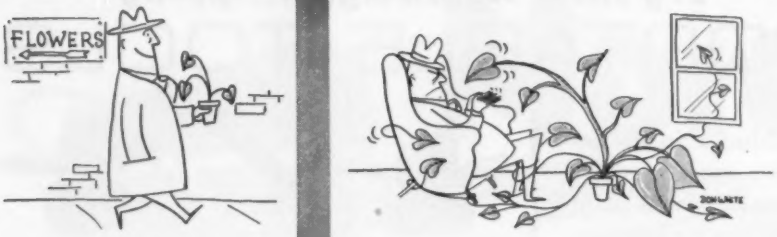
See how they can cut your costs!

Special bulletins on all tools on request.

THE ROTOR TOOL CO.
CLEVELAND OHIO



things to watch for when buying Philodendron



But if you're buying special purpose STEELS, may we recommend the SPEED STEELS

SPEED CASE	a low carbon free machining open hearth steel
SPEED TREAT	a medium carbon free machining open hearth steel
SPEED ALLOY	a chromium alloy steel

briefly they **are easy to heat-treat, are fast machining, give longer tool life, produce better finishes**

THERE ARE SPEED STEEL SPECIALISTS IN..

Akron, Ohio	Burger Iron Co.
Bridgeport, Conn.	Bridgeport Steel Co.
Buffalo, N. Y.	Beals, McCarthy & Rogers
Cambridge (Boston), Mass.	Brown Wales Co.
Chicago, Ill.	W. J. Holliday & Co., Inc.
Dallas, Tex.	Earle M. Jorgensen Co.
Detroit, Mich.	Peninsular Steel Co.
Hammond, Ind.	W. J. Holliday & Co., Inc.
Houston, Tex.	Earle M. Jorgensen Co.
Indianapolis, Ind.	W. J. Holliday & Co., Inc.
Lewistown, Me.	Brown Wales Co.
Los Angeles, Calif.	Earle M. Jorgensen Co.
Memphis, Tenn.	Pidgeon-Thomas Iron Co.
Newark (New York), N.J.	Grammer, Dempsey & Hudson, Inc.
Oakland (San Francisco), Calif.	Earle M. Jorgensen Co.
Philadelphia, Pa.	Horace T. Potts Co.
Toronto, Ontario	Peckover's, Ltd.
Tulsa, Okla.	Earle M. Jorgensen Co.

Write Today!

for new SPEED STEEL bulletins: 541 • 542 • 543

- ☐ *Bulletin 541* • SPEED CASE
- ☐ *Bulletin 542* • SPEED TREAT
- ☐ *Bulletin 543* • SPEED ALLOY

W. J. Holliday & Co., Inc.

141 141st STREET • HAMMOND, INDIANA

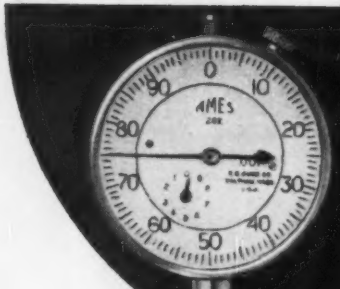
Speed steels are produced by W. J. Holliday & Co., Inc., Speed Steel Plate Division

YES SIR! Catalog No. 55—118 pages listing over 1400 sizes and types of highest quality, faster cutting and longer lasting end mills. There are 10 completely new pages, also changes and additions throughout the catalog. It will pay you to select your requirements from this catalog that lists the most complete line of end mills manufactured.

Indicative of the careful planning and useful features incorporated in this new catalog is the unique pictorial index where every type of Putnam tool is illustrated for your ready reference. See your Putnam distributor or write on your letterhead—this new catalog is yours for the asking.

PUTNAM
TOOL COMPANY
2981 CHARLEVOIX AVENUE • DETROIT 7 MICHIGAN

AMES



...the preferred Dial Indicators

Over 16,000,000 cycles without wear or loss of accuracy . . . how many more will they complete?

Several Ames Model 282 Long Range Dial Indicators *with plain bearings* are currently giving an amazing demonstration of performance and endurance under test conditions. After more than 16,000,000 cycles each, at 240 strokes per minute, 9 hours a day—they still have their original accuracy!

The reasons for this outstanding record? Simply high quality materials, simple basic design, rugged construction . . . and expert craftsmanship.

If you would like to have our recommendations on your measurement problem, send blueprints and specifications. And ask for your free copy of our catalog on Ames micrometer dial indicators and gauges.

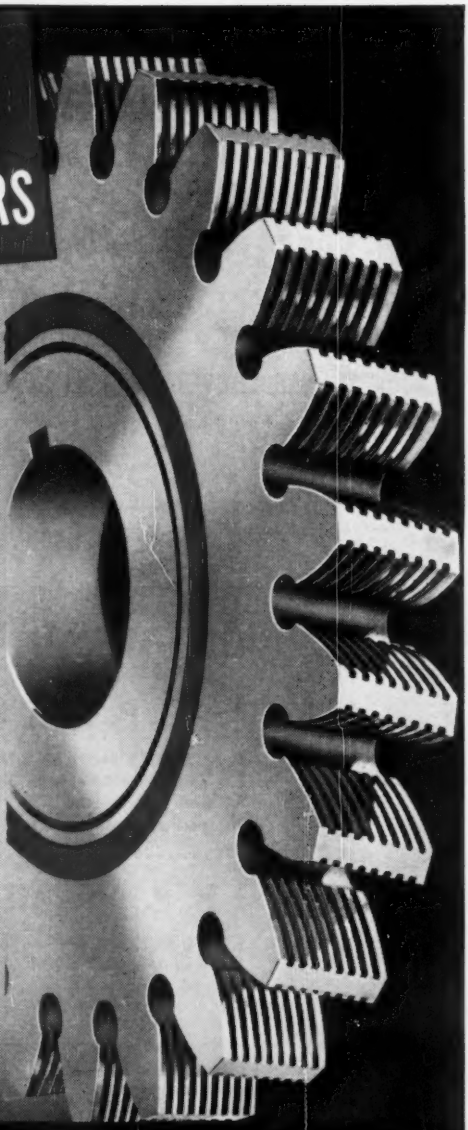
Representatives in principal cities.

B. C. AMES CO.

28 Ames Street Waltham 54, Mass.

Mfgr. of Micrometer Dial Gauges • Micrometer Dial Indicators

CHECK LIST
FOR BUYERS OF
SHAVING CUTTERS



Knowing the absolute necessity for QUALITY in your gear shaving cutters, you might consider these points the next time you order.

1. How much experience does the cutter manufacturer have?

   Since 1932 when National Broach built the first Rotary Gear Shaving Machine, this company has always been the largest producer of shaving cutters.

2. Has the cutter manufacturer a staff of engineer specialists who concentrate exclusively on cutter design?

   National Broach has such a staff.

3. Does the cutter manufacturer heat treat his own tools and is his grinding department temperature controlled?

   Every Red Ring Cutter is heat treated and controlled by Red Ring metallurgists and ground on special Red Ring grinders under precise temperature control.

4. Does the cutter manufacturer prove every cutter design by actual try-out in his own plant before it is released?

   No new Red Ring cutter design is ever released otherwise.

5. Is the cutter manufacturer prepared to assist you in cutter development—involute modification, etc. when needed?

   National Broach has always maintained such a service for you.

For further information, write for Chapter 2, Modern Methods of Gear Manufacture.

SPUR AND HELICAL GEAR SPECIALISTS
ORIGINATORS OF ROTARY SHAVING AND ELLIPTOID TOOTH FORM

NATIONAL BROACH & MACHINE CO.

5600 ST. JEAN . . . . . DETROIT 13, MICHIGAN

WORLD'S LARGEST PRODUCER OF GEAR SHAVING EQUIPMENT

7049

in MILL HEADS

RUSNOK

Builds the BEST Quality at the BEST Price

¼ H.P. CONVERTICAL MILL HEAD

Only low cost mill head with quill travel attachment.
High speed medium-light operation.
For bench, floor and pedestal mills.
Fits milling machines with overarm 1½" to 3".
⅜" end mill capacity.

$245.00

RUSNOK

½ H. P. MILL HEAD

HEAVY DUTY MILLING ATTACHMENT
Fits milling machines with 3" to 5" overarm.
¾" end mill capacity.
For vertical, horizontal and angular operations.

1 H. P. MILL HEAD

HEAVY DUTY MILLING ATTACHMENT
Fits milling machines with 3" to 5" overarm.
¾" end mill capacity.
For vertical, horizontal and angular operations.

RUSNOK

RUSNOK TOOL WORKS
4840 West North Ave., Chicago 39, Ill.
DEALERS IN ALL PRINCIPAL CITIES

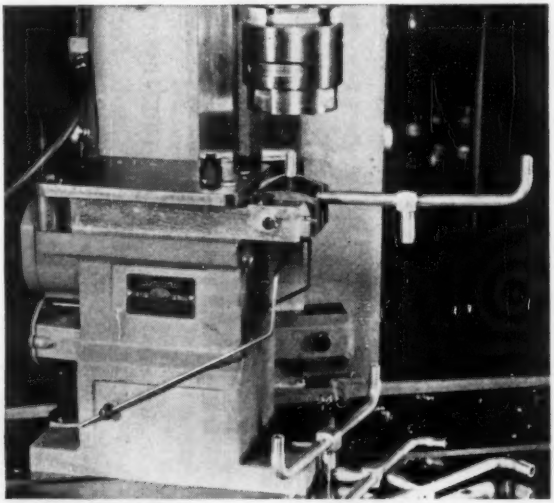
MILLING • DRILLING • BORING

Quicker changeover, lower tooling costs...

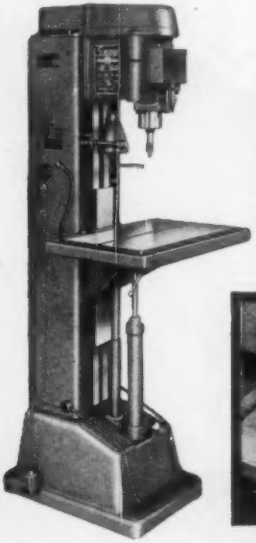
with SNOW FULL UNIVERSAL MACHINES

Basic Master Fixtures for DRILLING, THREADING or TAPPING. Snow universal machines are the most flexible, most efficient, and most economical known. They save countless dollars in changeover time — help you start jobs sooner — assure quality at high production rates.

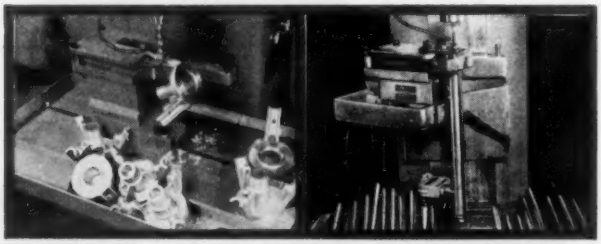
The square footage under a Snow Machine in your factory can be the most profitable in your whole plant. Submit details of your requirements.



AIR VISE holds part firmly — self-centering — always in exact position for precision work. U-shaped wire underneath provides quick finger-tip control, automatically starting spindle cycle. Jaw inserts keep tooling costs at minimum. Blank jaws always in stock — can be tooled to fit your part promptly, inexpensively.



ELECTRICALLY OPERATED AIR CONTROLLED AUTOMATIC OR SEMI-AUTOMATIC



Irregularly shaped parts are easily handled. Front feed permits close setting of guide plate for greater accuracy with high production

Here a short AIR VISE mounted on an offset table holds long tubing. Piece-part switch under table automatically closes vise and starts tapping operation.

SNOW MANUFACTURING CO., BELLWOOD, ILL.
(Suburb of Chicago)

Miller

HIGH PRESSURE
HYDRAULIC CYLINDERS

Thousands of Different Selections
For Immediate Delivery!

Rapidly expanding list of quality-famous Miller Cylinders for immediate, off-the-shelf delivery now includes thousands of different, popular selections—both hydraulic and air—cushioned and non-cushioned. Bores up through 5" hydraulic, 8" air. Over 30 different mountings. Strokes up thru 18".

Larger bores (up to 12" hydraulic, 20" air) and longer strokes (up to 22 feet) available on longer delivery.

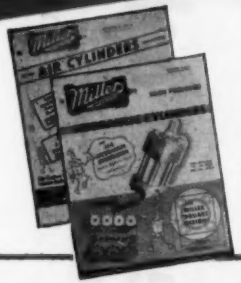
Miller Boosters also in stock for immediate delivery.

Write for Catalog and Stock List

DIRT WIPER SEALS

Protect Rods, Seals, Bushings

Standard Leather Cup Seal Assembly Shown Is Interchangeable With Miller Standard Piston Ring Piston Assembly



WRITE FOR CYLINDER BULLETINS H-104 and A-105

Complete Miller cylinder line includes: air cylinders, 1½" to 20" bores, 200 PSI operation; low pressure hydraulic cylinders, 1½" to 6" bores for 500 PSI operation, 8" to 14" bores for 250 PSI; high pressure hydraulic cylinders, 1½" to 12" bores, 2000-3000 PSI operation. All mounting styles available.

MET J. I. C. HYDRAULIC STANDARDS years before their adoption in 1949.

SPACE-SAVING SQUARE DESIGN originated by Miller in 1945.

SALES AND SERVICE FROM COAST TO COAST

CLEVELAND • YOUNGSTOWN • DAYTON • PITTSBURGH • PHILADELPHIA • BOSTON • HARTFORD • NEW YORK CITY • BUFFALO • ST. PAUL • GRAND RAPIDS • DETROIT • FLINT • FORT WAYNE • SOUTH BEND • INDIANAPOLIS • MILWAUKEE • LOUISVILLE • KANSAS CITY • SEATTLE • LOS ANGELES • SAN FRANCISCO • BALTIMORE • DENVER • ST. LOUIS • MOLINE • CHICAGO • HOUSTON • TORONTO, CANADA and OTHER AREAS

Miller

MILLER FLUID POWER CO.

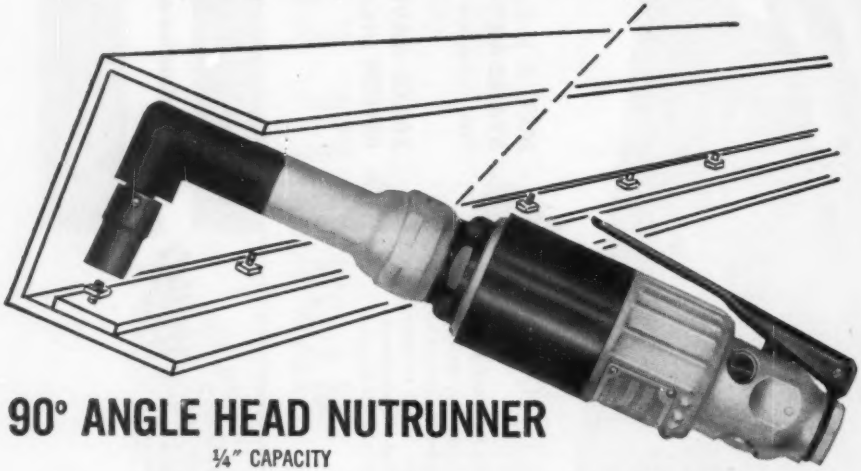
(Formerly MILLER MOTOR COMPANY)

2026 N. Hawthorne Ave., Melrose Park, Ill.

AIR & HYDRAULIC CYLINDERS • BOOSTERS • ACCUMULATORS
COUNTERBALANCE CYLINDERS

Keep your eye on Buckeye

for everything new in air and electric power tools!



90° ANGLE HEAD NUTRUNNER

¼" CAPACITY

Here's a brand-new Buckeye nutrunning tool, made to order for those costly jobs where operating space is limited. Gets right into the tightest corners, runs nuts and assembly costs down in a jiffy.

Has heavy-duty 90° angle head, designed for lowest overall tool head height. Adapter is an integral part of tool spindle to help reduce backlash. Accommodates full range of ¼" square drive sockets, for hex or square nuts.

There are no exposed moving parts to damage workpiece or injure operator. Bevel gear, ball bearing and spindle are separate units, each easily and economically replaced if necessary. Lever and Lock Button throttle models.

You can test-prove this new Buckeye nutrunner in your plant, without obligation. Just tell us where and when—we'll take care of the rest, and then you can be the judge!

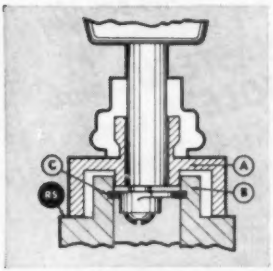
Buckeye Tools CORPORATION

DIVISION 14 • DAYTON 1, OHIO

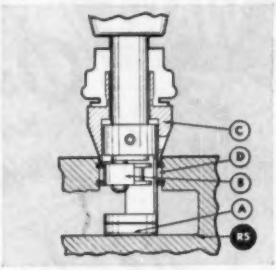
producers of the world's first successful rotary air tools

Waldes Truarc Grooving Tool Out-Performs Conventional Recessing Tools

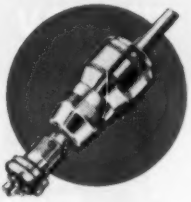
SAVES TIME! CUTS COSTS! NEEDS NO SKILLED LABOR!

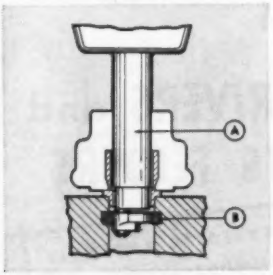


Clearing Obstructions or Protrusions – Waldes Truarc Grooving Tool with *special bushing* with high shoulder A in order to clear obstruction B on reference surface RS so groove can be properly located in bore.

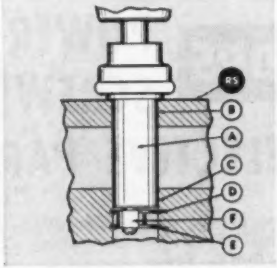


Locating Grooves from Bottom of Hole or Blind Hole—Use of *bottom adaptor* A and double cutter B. Bushing C pilots tool into bore D while bottom adaptor acts as stop to locate grooves from reference surfaces RS below bore.





Small Diameter Bore – Need for Wide Groove – Great versatility of tools allows A-2 Tool to accept *stepped down spindle* and *cuttershaft* assembly A. Provides cutting capacity in a bore normally within the range of smaller A-1 Tool. Illustrated, larger tool capacity necessary to cut groove diameter B exceeding normal capacity of standard A-1 Tool.



Extending Reach of Tool – Waldes Truarc Grooving Tool assembled with *extended bushing* A increases normal range of tool in order to reach proper groove location in bore. Bushing also registers on reference surface RS of workpiece while piloting tool at two points B and C inside bore. Two grooves D and E are cut simultaneously with double cutter F

AMAZINGLY VERSATILE! The Waldes Truarc Grooving Tool adapts quickly and simply to your toughest recessing requirements. With it, even *unskilled labor* can perform high precision, mass production operations.

WIDE CUTTING RANGE! The Waldes Truarc Grooving Tool comes in five models: A-1, A-2, A-3, B and C. This wide variety of models enables you to cut accurate grooves in housings with diameters from .250 to 5.000 inches. Special features, modifications and adaptations allow each model to operate efficiently under many varying conditions.

SEND YOUR PROBLEM TO WALDES! Whatever your internal grooving problem, send us your blueprints and let Waldes Truarc engineers give you a complete analysis, price quotation and delivery information on the most economical tool set-up for your particular job.

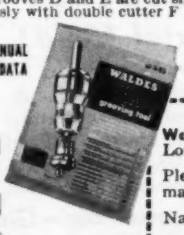
WRITE NOW FOR 20-PAGE TECHNICAL MANUAL CONTAINING FULL ENGINEERING DATA

WALDES

TRUARC

Reg. U.S. Pat. Off.

GROOVING TOOL



MADE BY THE MANUFACTURERS OF WALDES TRUARC RETAINING RINGS

WALDES KOHINOOR, INC., 47-16 Austel Pl., L.I.C. 1, N.Y.
Waldes Truarc Grooving Tool mfd. under U.S. Pat. 2,411,426

MT 017

Waldes Kohinoor, Inc., 47-16 Austel Place
Long Island City 1, New York

Please send me your new 20-page technical manual on the Waldes Truarc Grooving Tool.

Name_____

Title_____

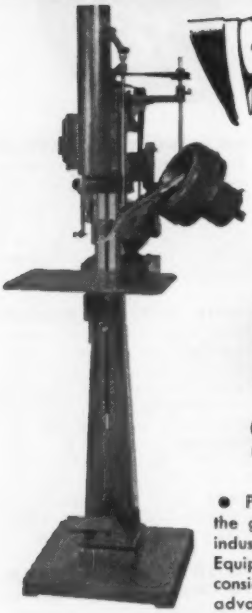
Company_____

Business Address_____

City_____ Zone_____ State_____

It costs you money to WAIT!

that's the penalty for continuing **WASTEFUL** *and* **OBSOLETE** *hand methods that hold down profits and production*



Modernize your assembly department with DPS POWER SCREWDRIVERS and SELECTIVE PARTS FEEDERS

● Proven beyond question, one of the greatest contributions to modern industry, Detroit Power Assembling Equipment demands your immediate consideration. Start now—Share its advantages with the thousands of the nation's prominent users.

SPEEDIER ASSEMBLY OUTPUT at FAR LOWER COST in 1955 and the years to come

DPS BOWL-FEEDERS *fill a Special Need!*

● In addition to our popular DPS Barrel Feeder, we offer the DPS Bowl Feeder designed to feed light, fragile parts that might not withstand tumbling. Operates on the VIBRATORY PRINCIPLE . . . fully automatic. Provides oriented single line feeding to Grinding, Packaging, Inspection and other automatic machines and operations.

Write today, send sample assembly—Give details!

DETROIT POWER SCREWDRIVER CO.

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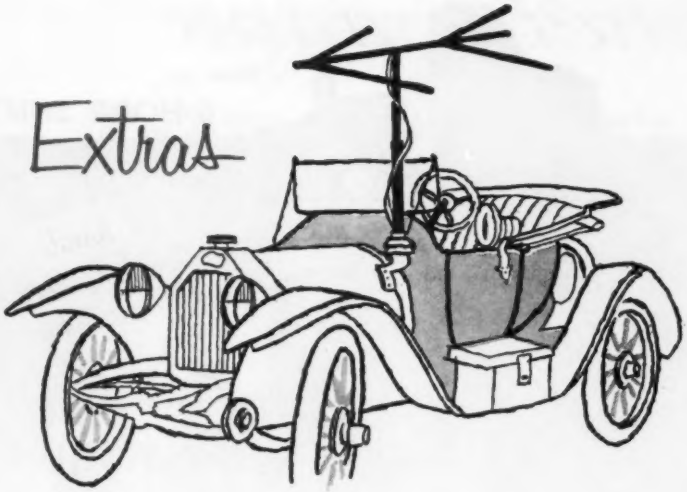
Extras



...are standard equipment at AMERICAN

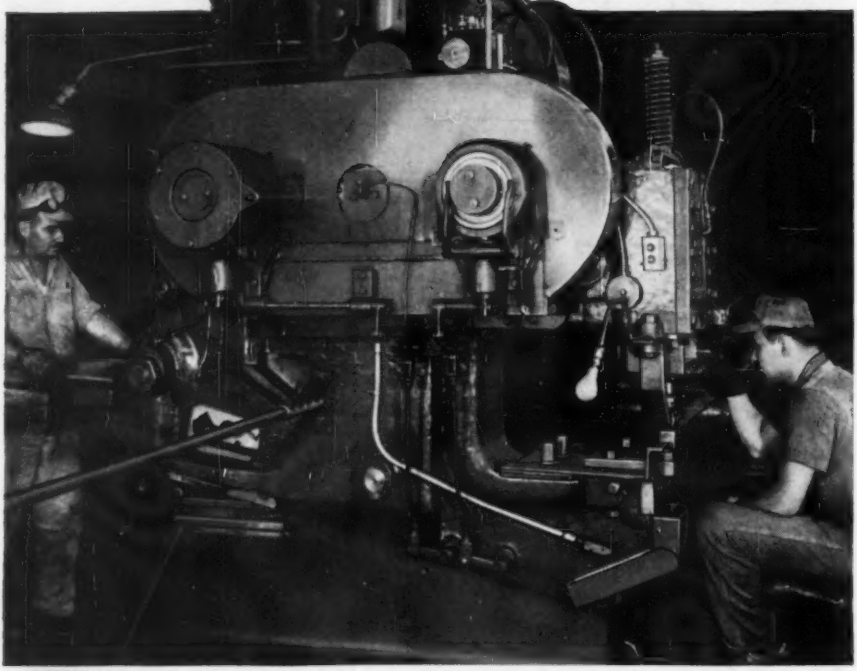
- Double ground lead for easy pressing into the jig.
- Radius into the hole—to prevent tool hang-up, wear and breakage.
- Two way undercut under the head to insure squareness to the jig.
- 100% concentricity inspection.
- Internal ground holes to insure straightness.
- Original 3-D ordering method eliminating confusing code numbers.
- Patented bushings for plastic tooling.
- Complete local stocks.

USE AMERICAN-PIONEERS IN PRODUCING DRILL JIG BUSHINGS WITH EXTRA FEATURES AS STANDARD EQUIPMENT.

Send today for the newest free Catalogs showing complete line.

American
DRILL BUSHING CO.
5107 PACIFIC BOULEVARD
LOS ANGELES 58, CALIFORNIA

16 HRS.' WORK from an 8-HOUR SHIFT!



Kling COMBINATION Shear, Punch & Coper...

Not only can two men do two different jobs on the Kling Combination simultaneously ... but each of the men at various times can perform many different operations with it. These jobs include Shearing Bars or Angles, Coping Angles or Channels, Slitting, Punching or Notching ... and half a dozen more jobs. Yet this Kling Combination Shear, Punch and Coper costs little more than a single-end punch, which it replaces.

For more data on Kling Combination and other metal fabricating machines, write for descriptive bulletins.

KLING BROS. ENGINEERING WORKS

1320 N. Kostner Avenue, Chicago 51, Illinois; Export Distributors: Simmons Machine Tool Corporation, 50 East 42nd Street, New York 17, N.Y.

Since 1892 **Kling**

...an investment in speed!

749 MT

Friction Saws

Double Angle Shears

Punches

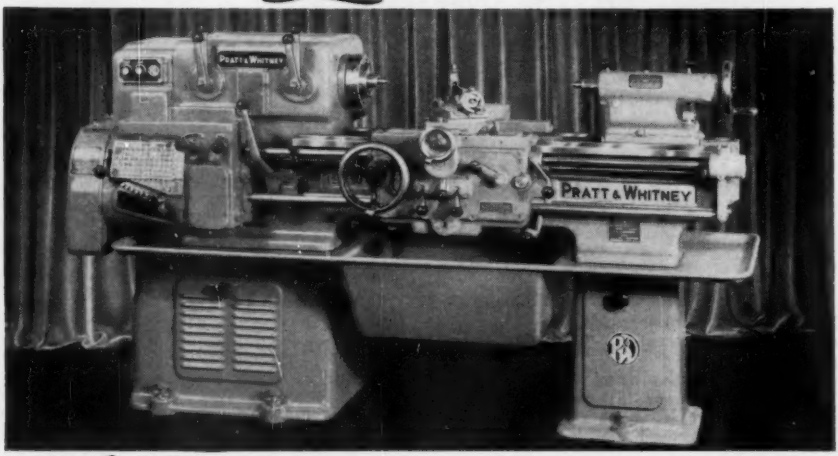
Plate Bending Rolls

When "Almost as Good . ." ISN'T GOOD ENOUGH

You turn to

PRATT & WHITNEY

MODEL "C" *Lathes* **12" and 16" SIZES in standard bed lengths**



For Precision to meet TODAY'S *demands*

Today, countless manufacturers must maintain daily standards of tool room accuracy unheard of only a few years ago. If this is **your** problem, you can't afford "almost as good" equipment. It's time to invest in a P&W Model "C" Lathe. Finest example of all that Pratt & Whitney stands for, the Model "C" incorporates every detail of advanced design, honest material and conscientious workmanship that help make this the finest lathe available anywhere at any price.

FOR COMPLETE INFORMATION . . . use this coupon to send for your copy of Circular 539 that fully describes all of the advanced features of the Model "C" Lathe. See for yourself how it will help you establish and maintain new standards of accuracy in your tool room.

PRATT & WHITNEY

DIVISION NILES-BEMENT-POND CO.

22 Charter Oak Blvd., West Hartford 1, Conn., U.S.A.

Please send my copy of Model "C" Lathe Circular No. 539.

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POSITION_____

COMPANY_____

CO. ADDRESS_____

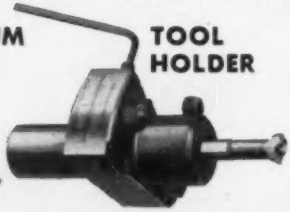
CITY_____ ZONE_____ STATE_____

A NEW STEP IN ECONOMY

for screw machine work

This Bokum line-up of stock tools—designed for screw machines and turret lathes—permits you to bore and recess holes faster, more accurately in small parts. ***Result:*** definite savings in time and money—reduction of costly rejects.

BOKUM TOOL HOLDER



BT-28, 30, 32, 34

Designed for holding Bokum boring tools in turret lathes and screw machines. Cat. 483 (Supp. #1).

BOKUM SHORT NECK TOOLS

Assure tool rigidity in precision boring of short holes. Both H. S. (Cat. HS-500) and carbide tipped (Cat. CT-500).

STANDARD BOKUM THREAD RECESSING TOOLS FROM STOCK

Obtain perfect threads in blind holes for the full depth of the hole. Cat. T-R.

STANDARD BOKUM BACK CHAMFERING TOOLS FROM STOCK

For cleaner, easier cut off without burr. Available (as are thread recessing tools) in sets. Cat. B-CH.

4125

Write Dept. H for catalogs today.

TRADE MARK REG. U. S. PAT. OFF.

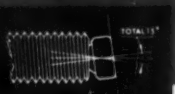
BOKUM TOOL CO.

14775 Wildemere Ave., Detroit 38, Mich.

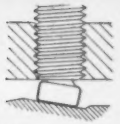
Ease of Handling

Here's the secret to positive clamping... freedom from marring!

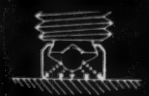
the New Vlier SCREW-BALL CLAMPS!



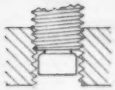
Ball-bearing construction insures frictionless, *automatic* angle adjustment and rotation; pad swivels freely in *all* directions up to 7½° from the centerline!



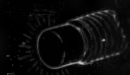
Pad seats firmly on work surface within angular range!



Force distributed equally to pad face. Conical seat distributes force equally in all directions; insures easy alignment in angular applications; greater freedom of motion.



Pad inserts from top of threaded hole or from bottom for easy installation!



Large pad area. Pad is machined from the solid, not counterbored or relieved; has greater strength plus freedom from distortion!

NO MORE EXPENSIVE, CUSTOM-MADE SWIVEL PADS ... 17 size variations, ⅝" O.D. up, N.C. threads, class 2 fit.

LOW COST... Saves hundreds of dollars annually in toolmaker's time!

NO MARRING. Rotation of pad ceases at first touch against the work! Soft pad saves surfaces!

HEX SOCKET HEAD... for easy hex key adjustment!

BLACK AS THE ACE OF SPADES! Completely rust proofed and hi-run!

KEEP VLIER SCREW-BALLS IN STOCK FOR INSTANT USE—SAVE YOUR TOOLMAKER'S TIME!

Ask your Vlier Distributor for an assortment of sizes today!

VLIER ENGINEERING INCORPORATED

MONEY-SAVING TOOLING SPECIALTIES FOR EVERY REQUIREMENT!

TORQUE THUMB SCREWS— Apply accurate, controlled end pressures; eliminate distortion to the workpiece. 4 models; 19 sizes!

VLIER SPRING PLUNGERS— For use wherever accurate, positive spring loads are needed! 4 models; 40 sizes!

VLIER SPRING STOPS— Provide end pressures in fixtures when wall sections are not available. Two models: 14 and 32 lbs. end pressure.

VLIER TOGGLE PADS— Assure solid clamping of parts with uneven or off-angle surfaces. 5 sizes; fit almost any clamp.

VLIER FIXTURE KEYS— New 5-Way Key fits every standard mill table slot. 3-Way model also available.

Write for your complete catalog of Vlier products today! It's free!

Ease of Handling

Efficient Performance

4 factors SAVE TIME, here

Photo courtesy of The Peck, Stow & Wilcox Company, Southington, Conn.

Minimum of "Down Time"

No Operator Fatigue

The Peck, Stow & Wilcox Company point out that the general performance, handling, along with reduced operator fatigue and a minimum of down time of this modern Cincinnati Bickford Super Service Radial Drill effected a 20% time saving in their shop.

The illustration shows the drilling of housings for the Pexto Power Shears. Each piece that formerly required 2 hours is now completed in 1½ hours.

Investigate Cincinnati Bickford Drilling machines, profit makers for 80 years.

Write for Bulletin R-29.

80 YEARS OF SERVICE

CINCINNATI BICKFORD

RADIAL AND UPRIGHT DRILLING MACHINES

THE CINCINNATI BICKFORD TOOL CO.

Cincinnati 9, Ohio, U.S.A.

AS THE *Editor* SEES IT

Time Is Ours

We are at the point where man chops into the cycle of life and makes an arbitrary division in Time. He calls it the beginning of a new year. The old is dead, on with the new!

Some now look behind, some forward, but all with the bright hope that destiny might be in their hands for the next length of Time. Yet neither fortune nor destiny is divisable into cycles, it cannot be chopped up and divided. A new year is born every day for Time is an endless cord, slipping through our hands. We cannot stay, divide nor share it. Each man has his own cord and it slips with the constancy of the seasons through his hands.

It never belongs to one man for long. Nor for a Hitler, a Stalin, nor unfortunately, for a Lincoln or a Shakespeare; yet it belongs always long enough for each of them to have tied their knots. And so does each of us have the opportunity to tie our knots the instant the cord passes by. We have, all of us, the same chance, we fondle, each of us, our cord. It is our Time for a fleeting moment; it is ours each day, tempting us and beckoning us to do something with it. Our destiny and our fate is in our possession.

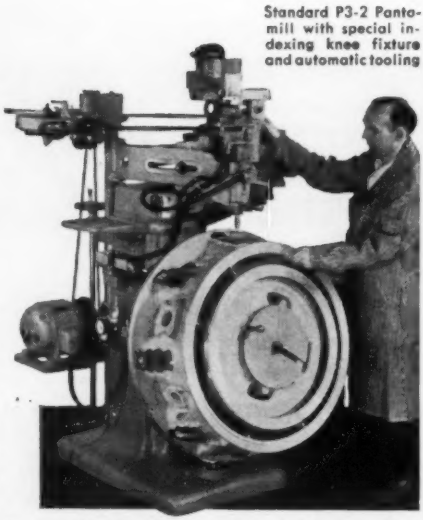
Some handle the cord with skill and leave their marks on it; others look down its seemingly endless length and seek a likely length where they might leave their marks. But when the likely spot comes into their hands, their eyes are once again on another length, and so we make a division of our Time, and at the beginning of each division promise ourselves we will do more with it than we have. And we call this new length a new year and look for a likely length until one day the cord slows and suddenly, silently is gone forever.

Let us tie our knots each day, for each day is a new year, a new length of Time. Let us leave our mark each day. It is ours for an instant, but ours nonetheless. We musn't wait.

William F. Schleicher

GORTON
TRACER CONTROL
at Its Best

Infinitely variable speeds and feeds...no lead screws or gear boxes to limit flexibility



Standard P3-2 Pantomill with special indexing knee fixture and automatic tooling

Photo shows a standard P3-2 profiling ports in an aircraft part, a large aluminum-alloy casting. The sides of each port are parallel; one end has a true radius, the other end is parabolic. A combination of other methods would do the cutting in hours, but the P3-2, with an automatic cutting cycle, finishes each port in 2.3 minutes.

Improve Production and Lower Costs

Gorton tracer-controlled equipment does efficient profiling, routing, die sinking, mold cutting, counterboring, chamfering, grooving, graduating, engraving and many other standard or special operations. You can expect high accuracy and high surface finish, whether your work involves metals or plastics in flat, uniformly curved, cylindrical or irregular shapes.

Enlarged templates, masters or patterns, all quickly and easily made, give Gorton Pantographs advantages of increased accuracy through reduction ratios. Work pieces range in size from the diameter of a dime to 10 feet. Cutting cycle is accomplished manually or automatically.

Fill out and mail the coupon for your copies of the Gorton catalog and the informative booklet, "Pantography."

GEORGE GORTON MACHINE CO.

1401 Racine St., Racine, Wis., U.S.A.

Please send at once complete information about the Gorton line contained in Bulletin 1655-1401.

Firm.....

Name.....

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City, State.....

A R10R-1PA

Helical Carbides Now Available

In the November, 1954 issue of Machine and Tool Blue Book, you (Horace A. Frommelt) wrote an excellent article on the cutting forces and their effects on milling operations and milling cutter selection. There is one point, however, which I thought I might enlighten you on. On Page No. 189 you state that the choice of a face mill over a slab mill becomes even more imperative when we consider that carbide has never been successfully adapted to slab mills. I am enclosing literature on the slab mills made by our company and others in the field . . . It is possible that the data from which you wrote your article is a little old and, therefore, you did not have the complete story on Helical Carbide. This is a development of the past four years, that has just been put on the market recently, by about four carbide tool manufacturers.

Merle Hilliard, General Manager
Sonnet Supply Company

Ed. Note: An article on the helical carbide milling cutter appears in this issue. See: Helical Carbide Milling Cutters Triple Cutting Speeds on 4140 Steel.

Like Time Study Articles

We wish to thank you for the reprint of Harold R. Nissley's articles on Time Study which apeared in MACHINE and TOOL BLUE BOOK.

After reading the articles thoroughly, we have found them so worthwhile that we would be very grateful if you would send us eight (8) additional copies.

Robert H. Hampton
Supv. of Standards
Threadwell Tap & Die Co.

We are in receipt of, and wish to thank you for, the first three parts of Mr. Nissley's articles on Time Study.

This has proved to be very interesting and helpful data. Particularly interesting is the manner in which this subject has been presented.

W. Bader, Vice President
Research & Development Div.
Wesson Company

I have just finished reading Part No. 3 of the featured article by H. R. Nissley, "Incentive Systems Applied to Job Shop Operations." This is, without a doubt, one of the finest articles on inventive systems to come along in a long time. I would deeply appreciate your sending to me "Tear Sheets' on this; and also the previous two articles, that I unfortunately missed reading.

J. P. Dennis, Jr.
Methods Department
The Sharples Corporation

Have studiously followed Mr. Nissley's series of articles on Time Study but I missed the article entitled "How to Make Your Time Studies More Accurate" and would greatly appreciate a copy or tear sheet of this article.

Would suggest your making up a pamphlet upon completion of series and offering it for sale. It would, in my opinion be well received.

Richard R. Gaucher
Time Study Engineer
Russell Harrington Cutlery Co.

Tear sheets have been sent. Complete sets have been made of parts 1 through 5. As long as the supply lasts they will be sent at no charge.

Cutting Forces in Milling

Please forward tear sheets, if available, of Mr. Horace Frommelt's article "Understand Cutting Forces for Better Machining Practice" in the October issue.

R. C. Fennema, Production Mgr.
E. W. Bliss Company

We are desirous of obtaining copies of the following articles which appeared in the November 1954 issue of your publication MACHINE and TOOL BLUE BOOK.

1. "Cutting Forces: Their Effects on Milling Operations & Milling Cutter Selection"—Author H. A. Frommelt.
2. Report No. 43—Presses Part V—Authors—The Editors.

Tear sheets, reprints, or photostatic copies meet our requirements and upon receipt of invoice covering the expenses, we will forward a check or money order to cover.

P. Zaremba, Administrative Eng.
Fairchild Camera & Instrument Corp.

Tear sheets sent. No charge.

Forming Titanium

We have read, with interest, the paper "How Ryan Forms Titanium" by Frank Charity which appeared on pages 228-232 in your October issue.

We wonder if it would be possible to obtain fifteen tearsheets or reprints of this article for distribution to our key technical personnel. Kindly direct your answer, along with your invoice for any charges, to my attention.

D. G. Weaver, Technical Editor
Acheson Colloids Company

Tear sheets sent.

Drill Jigs

Please send two (2) copies of the article by J. Ziegler on Skillful Design of Triple and Double Leaf Drill Jigs. The article apeared in Machine and Tool Blue Book, Vol. 49, No. 4, April 1953.

Thank you for your consideration.

R. C. von Felten, Prod. Eng.
Kearfott Company, Inc.

Tear sheets sent.

Production Tapping

Our shop has requested fifty copies of the article, "Trends and New Developments in Production Tapping." This is the feature article by Harry Conn appearing in your July issue of the MACHINE and TOOL BLUE BOOK. If there is any charge for these reprints please send us an invoice which we will promptly pay.

N. J. Hawke, Jr.
Purchasing Agent
Aviation Gas Turbine Div.
Westinghouse Electric Corp.

Information, Please

Can you give us the name of the firms that make an automatic cutoff machine for tubing?

Our problem is that of taking laminated phenolic and vulcanized fibre tubing and cutting it off into lengths automatically.

This could be done on a screw machine but we feel that there is a machine that would automatically feed in the tubing or rod and a cutoff tool would chop the pieces off to exacting lengths.

Trusting that you may be able to assist us.

William K. Davis, Partner
Penn Fibre & Specialty Company

Would appreciate it very much if you could send us all the information available on how to make springs by hand. We have all the material needed, but we don't know how to go about making them.

C. J. Regino, Owner
Laredo Gun Shop

We are interested in obtaining a subcontractor equipped with machine tools suitable for the internal grinding of cylinders 22¼ inch OD by 20.50 inch ID by 5 feet 8 inches long, ID must be ground to tolerance of plus .005 inch minus .000 inch. Would appreciate any assistance you might be able to give us in connection with this requirement.

G. M. Farrington
U. S. Pipe & Foundry Company

Information supplied.

PDQ

QUICK CHANGE MICROMETER BORING BAR

by PORTAGE

FEATURES...

- ★ **Precision Accuracy.**
- ★ **Tool offers *new* ease in operator adjustment.**
- ★ **Micrometer-adjusting screw is *not* exposed to dirt and chips . . . entire screw is enclosed in the bar.**
- ★ ***Wedge Clamp* offers positive locking of the tool bit.**

This newly designed and patented micrometer boring tool offers additional features not found in other precision boring tools. All of the critical precision parts of the tool are completely enclosed and protected in the bar itself. Wedge clamp design offers a new standard in tool bit holding power and overall bar rigidity.

Write for literature covering *ALL* the features of this new tool.

PDQ

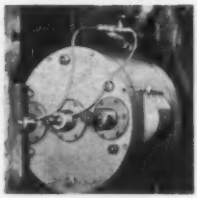
PORTAGE Double-Quick TOOL CO.

1037 SWEITZER AVENUE • AKRON 11, OHIO

Quickie Products

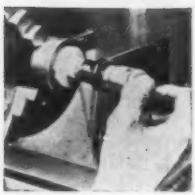
to increase your production

Thread Triangles. Precision-ground gages in the form of 2 60° triangular bars. Gives full bearing line contact on the thread V, triangles nest in threads. No complicated formulas to figure, even for special threads. Works on all 60° threads from 4 to 56 pitch, any O.D. Only simple addition needed to figure special O.D. threads. Price $8.60 per set. Further information, encircle **C** on Literature Card, page 265.



Three Spindle Milling head cuts three tee slots at one time. Three keyslots can be milled in one pass with center distances between outside slots up to 14″. Spacing obtained by turning the head. Male dovetails can be surfaced on top and both sides in one pass. Tops and sides of rectangular projections can be milled simultaneously by using face mill and two-edged cutting slab mill. Information, circle **H** on Literature Card, page 265.

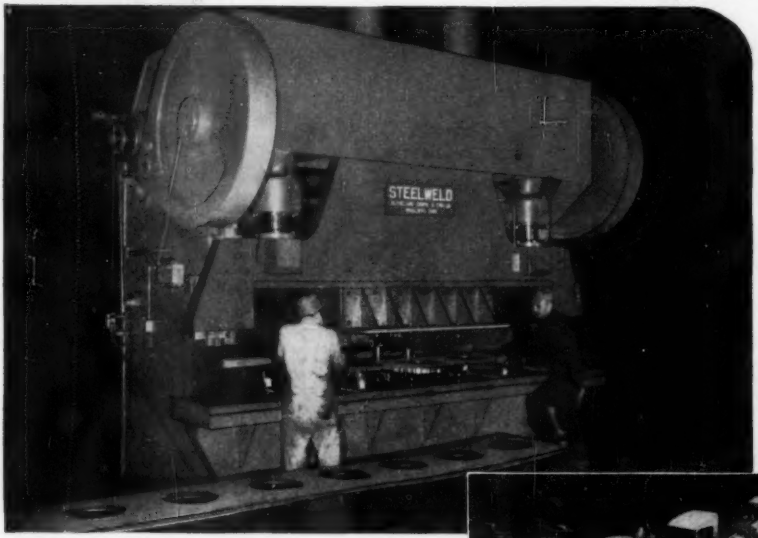
Foot Controlled Air Valve operates vises, fixtures, punch presses, stapling, riveting machines, etc. Treadle valve design allows operator to place full weight on heel portion of valve. Shifting pressure (foot) forward actuates valve to degree desired. Price: $15.00. Encircle **D** on Literature Card, page 265. for more information.



Internal Micrometer accurately determines bore diameters ¼″ to 8″ to .00005″, .0001″ and .0002″. Irregular spacing of gaging pins (anvils) detects most forms of out-of-roundness. Pins fit tightly, no open keyway in head for dirt to enter. Requires no skill or "feel." Thimble which actuates taper needle is controlled by spring, assuring repetition of measurement. Encircle **L** on Literature Card, page 265.

Punches 15" Holes For Warner & Swasey Gradalls

Also Performs Bending and Flanging Operations

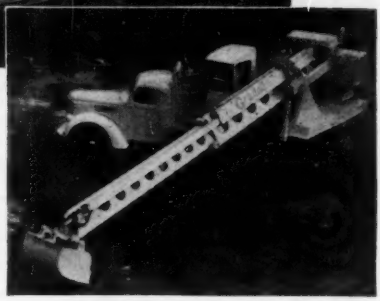


Flanging 15" diameter holes in outer boom plates of 3/16" steel. The holes were punched previously on this press.

Practically all of the steel plate on Warner & Swasey Gradalls, manufactured at their New Philadelphia, Ohio plant, is formed, punched and flanged on a Steelweld Press which is designed to brake steel plate up to 16' x ½".

One of the more interesting jobs done on this machine is the punching of 15" diameter holes in Gradall boom plates, followed by a flanging operation. Through use of special movable punches, many smaller holes of various sizes are made at a time, in locations as desired.

The versatility of Steelweld Presses to handle efficiently many varied operations has proven of tremendous advantage to many users. You, too, may find the many features of these machines of great help. A representative will be glad to give you the details.



Gradall ready for action. Has ½ yd bucket and 24 ft. telescoping boom that lifts, tilts, and turns 360° around truck.

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CATALOG No. 2010 gives construction and engineering details. Profusely illustrated.

THE CLEVELAND CRANE & ENGINEERING CO.

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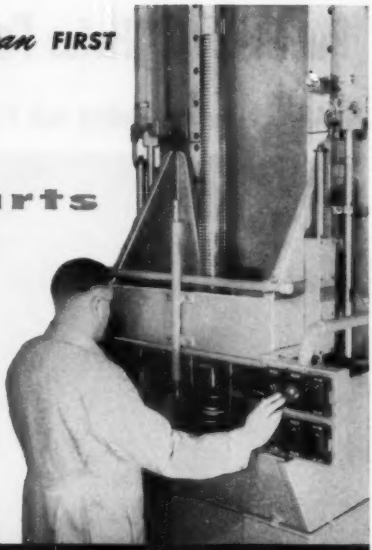
STEELWELD

BENDING PRESSES

BRAKING • FORMING • BLANKING • DRAWING • CORRUGATING • PUNCHING

ANOTHER *American* FIRST

28 different diesel truck parts BROACHED on ONE MACHINE



★Machine utilizes three types of broaches — round, plain spline and combination round-and-spline.

★Interchangeable thrust bushings which adapt to a universal equalizing fixture.

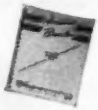
★One to three station broaching depending on size and shape of part to be broached.

Here's an example of the flexibility of tooling American can build into a broaching machine to fill special requirements. Shown at left are some of the 28 different diesel truck parts a manufacturer is producing with the aid of an American vertical pull-up broaching machine. Note the variety in types of parts — broach lengths varied from 33 to 70 inches.

An added feature of this machine is a lower elevator follow-up during the first part of the broaching stroke providing greater back support and eliminating vibration.

Whether you need extreme versatility — with many parts broached by one machine, as in this example — or the high volume, low cost production resulting from completely automated broaching of single parts, American is prepared to serve you. American engineers and builds all three — broaching machines, broaches and broaching fixtures.

Let us work on your broaching problem.



Write for catalog 450 — the new and informative manual on American broaches, machines and fixtures.

AMERICAN *American* BROACH & MACHINE CO.

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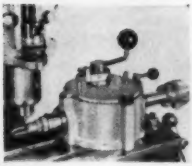
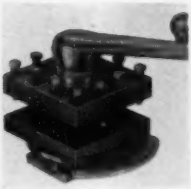
See *American* First — for the Best in Broaching Tools, Broaching Machines, Special Machinery



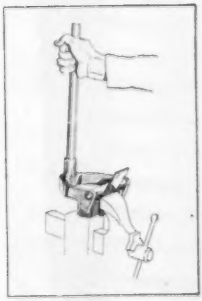
End Mill Grinding Fixture simplifies sharpening of end mills right in the shop, eliminating sending end mills out for sharpening. Head removable from fixture and can be used with cutter grinders and milling machines for spiral milling, flute, step grinding, etc. 31″ long, 18″ wide, 16″ high, 85 lbs. Either complete with base, or head may be had separately. Encircle **M** on Literature Card, page 265.



Turret Tool Holder indexes to 120 accurate positions. Turret includes a 12 position detent selection, plus or minus .001 at 24″ from C/L, ideal adaption for carbide tools. Holds four tools. Can be fitted to individual lathes. Get additional information by encircling **F** on Literature Card opposite page 265.

Oil For Abrasive Belts improves finish and belt life. Said to increase production 50% to 100% in belt grinding and polishing. Comes in 12 oz. pressurized cans. Merely spray it on belt. Two types: for use with non-ferrous and for use with ferrous metals. Case histories available. Encircle **B** on Literature Card, page 265.

Quick Change tools for small mill operations claim to save up to 80% in machine down time. Only ½″ tool clearance needed between end of tool and workpiece to change tools. These tools eliminate almost entirely shifting or lowering table when changing tools. Sets include tool holder, boring bar adapters, drill sleeve adapters, end mill, shell, face mill, Jacobs chuck adapters. Circle **J** on Literature Card, page 265.



Low Cost Hand Bender. Clamp it in standard machinist's vise, place metal to be bent between bender and front jaw of vise and bend. Fits vise with jaws 4½″; bends cold rolled or equivalent. Bends and forms all shapes. Does not mar metal, is accurate, easy to operate and costs only $12.95. Further information, encircle **E** on Literature Card, page 265.

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PRODUCTS
Socket screw users who want *what* they want *when* they want it know it pays to specify B-RIGHT-ON! Brighton Socket Screw products *always* measure up. Standard or special, Brighton Screws must meet and pass factory standards that are higher even than those specified by the ultimate user of the screws. Rigid control, from initial steel selection to final packaging, certifies every screw as B-RIGHT-ON quality.
Selected mill supply houses, Brighton distributors, complete the control chain, assure the user of service and delivery as dependable as the screws. . . . B-RIGHT-ON service.
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LAST MINUTE WASHINGTON NEWS

★★★

by Arnold Kruckman

Smuggling Machine Tools to China

WASHINGTON . . . The white paper released late in November by the Japanese Maritime Safety Board revealed what is not especially a secret: the ill will of a large segment of certain sections of the Japanese population. This is shown in the manner in which these lawless Japanese are shipping large quantities of machine tools made in Japan to the Chinese.

The white paper disclosed that a large number of foreign ships are smuggling machine tools from Hong Kong and from the South Korean Port of Masan to a Northern Korean Port known as Kyushu. From this place the machine tools are distributed to industrial centers of China in a steady stream. Of course, they go in the largest number to those communities where the Chinese make war material.

The Japanese Government is sincerely concerned about it because the return traffic brings really vast cargoes of narcotics for distribution in Japan and through Japan to other parts of the East as well as to Europe. In addition, it is known that with the narcotics come dangerous numbers of Communist agents of various kinds. These Communists spread out in all directions in Asia as well as in Africa and are filtered into the United States and Europe.

The Japanese Government is at a loss to know just exactly what to do at this time. The machine tools are taken one way by what they call unknown foreign ships, and the narcotics and Communist missions are brought the other way by either the same or similar ships. The white paper emphasises that it does not feel it may disclose what the Japanese believe is the nationality of the shipping that is carrying on the smuggler trade. Apparently the Japanese Government knows that these ships operate under the flags of various Asiatic nations and particularly under the flags of North and South American and of European nations. Obviously, Japan is not able to take the essential steps to stop the traffic. Apparently the white paper was designed to support the demand made by Senator Knowland for the blockade of Chinese Communist ports, and other Communist shorelines through which the Chinese receive the contraband that concerns the interests of the Japanese. There is more to Senator Knowland's demand for some action to choke Chinese Communist activities than appears on the surface of the discussions that leak through the news.

For Accuracy and Alignment

The BAKER

MODEL O KEYSEATER

The Baker Model O Keyseater has ample capacity to cut keyways in mild steel up to 9" long x 1" wide at a feed of .005 inches. Machine is furnished to take standard cutter bars of ½", ⅝", 13/16", 1" and 15/16" diameter. Baker Keyseaters maintain utmost accuracy and alignment in the finished keyseat. Write for full details.

BAKER BROS. INC., Toledo, Ohio

DRILLING . . . TAPPING . . . KEYSEATING . . . CONTOUR GRINDING MACHINES

Aircraft Production Down

Admiral DeWitt C. Ramsey, President of the Aircraft Industries Association, is responsible for the statement that U.S. military aircraft production is gradually declining. He says what is happening is part of the long-range plan for a transition from "build-up" to "sustaining" production for the Armed Services. Admiral Ramsey is also responsible for the statement that last year's output reached a peak of a thousand planes per month. Today, production is under 900 planes per month, and according to the Admiral, will continue its gradual decline to, in his words, "a level adequate to maintain full modernization of the planned U.S. military air strength."

The goals are 137 Air Force wings and consistent Naval aviation strength. These are scheduled to be achieved about mid-1957. But military aircraft production is expected to level off several months earlier.

The plan provides new and modernized aircraft to preserve a mobilization base sufficiently broad for rapid expansion in event of emergency. The current goals call for an active inventory by 1957 of 40,000 military planes, more than half of which will be jet-powered.

Admiral Ramsey emphasizes that employment will not be reduced in proportion to the cut-back. He points out that the mounting weight and complexity of modern supersonic military planes require more man-hours per plane; and it is expected there will be greater devotion to increasing guided missile development and production. Particular emphasis is laid upon the importance of programming, research and development and production. **If Admiral Ramsey and his associates have their way there will not be a repetition of the optimism which in the past led the United States to dismantle its defense industries and demobilize its Armed Forces prematurely. On all hands you hear it is more important to have long-range planning today to meet defense needs of adequate strength, and to meet our international commitments.** It is stressed, when the Korean War began we were caught far short of requirements both for military air power in being and for aircraft production potential. The Air Force had only forty-two effective wings, and the aircraft industry was building only 210 military planes per month. It took several years, and billions of dollars to rebuild the industry to the point where aircraft production volume could meet the military's needs. We are told the aircraft industry itself invested more than $1.2 billion in expanding its facilities from 1950 through 1953. We have been able to produce more than 35,000 planes since the start of the Korean War, constantly improving performance and striking power. The Aircraft Industries Association is particularly proud of the large and efficient management recreated for engineering and production teams that are essential to the volume production of fighting planes. It is felt these teams provide a solid base from which vastly expanded production could be launched if required.

New Leaders in Congress

The personnel that will take over the Government on the Hill after New Year is naturally of keen interest to every business man. The entire machinery of Congress will be conducted by new leaders in the Committees. Ob-

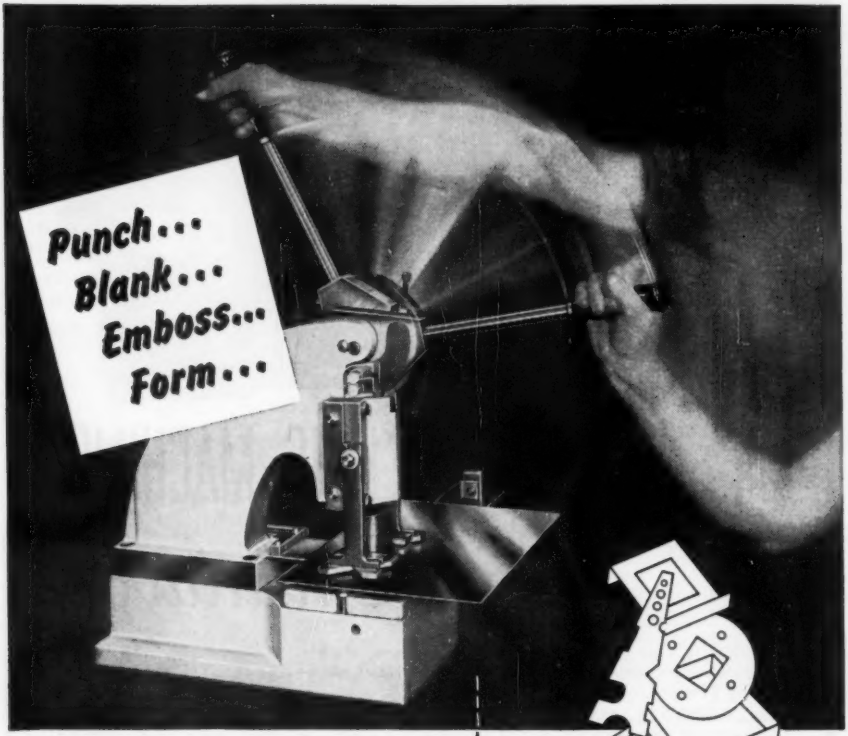
viously, they will have to work with a political Administration that is antipathetical to their philosophy. In the past, during the Hoover Administration, and during later Administrations, we have seen that these split administrative adjustments have entailed some trouble and disagreements. But it is doubtful there will be as much conflict under existing circumstances. There is not as much meaning in the assumed division between Democrats and Republicans. It is rapidly becoming clear that a division must come between the Liberals and the Conservatives. Many Democrats are fully as Conservative as the men and women on the other side of the aisle, and many Republicans are fully as Liberal as those who are labeled Democrat. For this reason, the months ahead will probably be less confusing by reason of the traditional Party labels than by reason of the swiftly approaching showdown between Liberals and Conservatives. Normally those elected under an existing label will vote in Congress according to the label; but there will be frequent occasions when they will vote according to their Liberal or Conservative leanings. It is this situation which will make the months ahead full of tensions and excitement and uncertainties.

Issues Before Congress

The chief issues which will come before the Congress will have to do with international affairs—both across the Atlantic and across the Pacific. During the first four months of the fiscal year 1955 the Foreign Operations Administration has already disbursed $1,526,724,128—thus far by $100 million the largest sum given away in a comparable four months. Under present circumstances, as pointed out by Paul O. Peters, $100 million isn't very much money; but it can rapidly mount into large sums of money if the increase is augmented in a similar manner from one period to another. In one month recently FOA increased its payroll from 5,131 to 5,569, a gain in one month of 438 additions to the payroll. It is now estimated that the average salary on the payroll is $5,000 per person; therefore the addition of 438 persons swells the FOA payroll alone by $209,000 a month. And next month there will be more on the payroll.

While on the subject of the international legislation that will be offered in the next Congress it may be wise to bear in mind that much will be done to induce us to accept the United Nations program without material discussion. A new plan has been offered to lure the United States into a new organization under the UN having as its purpose the prevention of future wars by a leveling-off process under which the resources of the various nations will be made available to the people of all countries.

The plans have been advocated by very sincere official representatives of member nations of the UN. One of the most urgent features of the several programs that have been proposed is the emphasis upon the idea that all nations shall open their gates to immigration and emigration, and their ports to free trade. Under this plan, or these plans, no nation would have individual sovereignty. One of the most recent pronouncements concerning the idea for some reason carried with it a statement of the public and private



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Deep throats—6 and 12 inches—of Di-Acro Punch Presses make them ideal for many operations that cannot be performed on most bench type presses.

Holes of various shapes and sizes—as large as 4" in diameter in 16 gauge steel—can be punched. Rated capacity, four tons. A variety of readily interchangeable punch and die sets are offered in round, square, notcher, rectangular and oval shapes.

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DI-ACRO* POWER PUNCH PRESS

Di-Acro Power Punch Presses are designed for high speed production. Rated capacity, five tons. 180 strokes per minute. Motor driven flywheel, other moving parts housed in welded steel cabinet.

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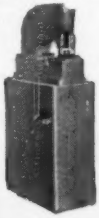

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NOW *Available!*

LANDIS is now offering a revolutionary new machine for producing threads, not available anywhere else in the Western Hemisphere—the LANHYROL Thread Rolling Machine.

The LANHYROL produces strong, accurate threads of excellent finish by the chipless, cold-forming process—and offers unequalled output, flexibility, and range coverage:

* * * It will produce left- and right-hand threads of all types (except square), including UNC, UNF, Acme, worm, and many special forms.

* * * It will thread all diameters from 3/16" to 3".

* * * Threads are rolled by four distinct methods—Infeed, Thrufeed, Continuous, and Reciprocal. The rolling method used is determined by the length and type of thread and the design and hardness of the workpiece.

* * * Threads can be produced to Class 2 and 3 fit by Continuous Rolling, and to Class 4 fit by Infeed, Thrufeed, and Reciprocal Rolling.

* * * Production rates are high. They vary with the individual operation, but for example—600 pieces per hour, rolling ⅞" 9 pitch UNC threads 1¼" long on 4140 steel of 29C Rockwell hardness, using Infeed Rolling with semi-automatic operation and manual loading.

* * * Hopper equipment, automatic operation, and auxiliary equipment for special threads is available.

The LANHYROL Thread Rolling Machine is an important new addition to The Landis Line of Threading Equipment developed by more than 50 years of research and experiment. Additional information on request—please send specifications and ask for Bulletin *E-60*.

LANDIS *Machine* COMPANY

WAYNESBORO • PENNSYLVANIA • U. S. A.

419

debts of the United States. These included the Federal public debt, State and local debts, non-farm mortage debts, net corporate debts, consumer credit outstanding, farm debts and private debts other than mortages: the total was $640,939,000,000.

Of course taxes, and the revision of taxes, will be one of the early targets for legislation; also, amendments will be offered to patch the Constitution. These amendments will include the Ebinger Amendment which is aimed at restoring to the States their original powers, and which is supported actively by the American Bar Association.

There will also be several proposals for a new minimum wage law. These will be of particular interest to smaller business men, to those who have jobs in shops, office workers, janitors and others qualified as day laborers.

The Deficit

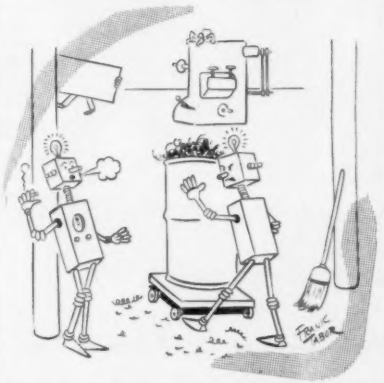
Executive Vice President Orval W. Adams of the First National Bank of Salt Lake City, testifying in relation to the latest deficit of $7,159,711,841, said: **"As individuals and classes we are rapidly losing our national outlook. Our protests against the unlimited outpouring of borrowed money grow fainter and fainter. States and their local subdivisions are losing their Constitutional autonomy. Federal projects and grants have done their work. We have abandoned many of our time-honored safeguards.**

"Prior to 1933, we balanced our Budget on an average of four out of five years throughout our history as a Nation. When we abandoned the discipline of gold-convertible currency in 1933, we permitted the Trojan Horse of monetary ruin to enter our gates. I believe that we cannot survive unless this discipline is restored."

New Members of Congress

All Chairmen of Senate and House Committees will be new. This does not mean that they will be new to Congress, or to the nation. They will be new in substituting for the Republicans who are obliged to retire. Senator Allen J. Ellender of Louisiana will head the Senate Agriculture and Forestry Committee. . . . The Senate Appropriations Committee will be headed by Senator Richard B. Russell of Georgia. It is likely that his place will be taken by Senator Lyndon B. Johnson of Texas. The Senate Banking and Currency Committee, in all likelihood, will be headed by Senator J. W. Fulbright.

The Senate Finance Committee in all likelihood will be headed by Senator Harry Flood Byrd of Virginia, although the ranking Member is Senator



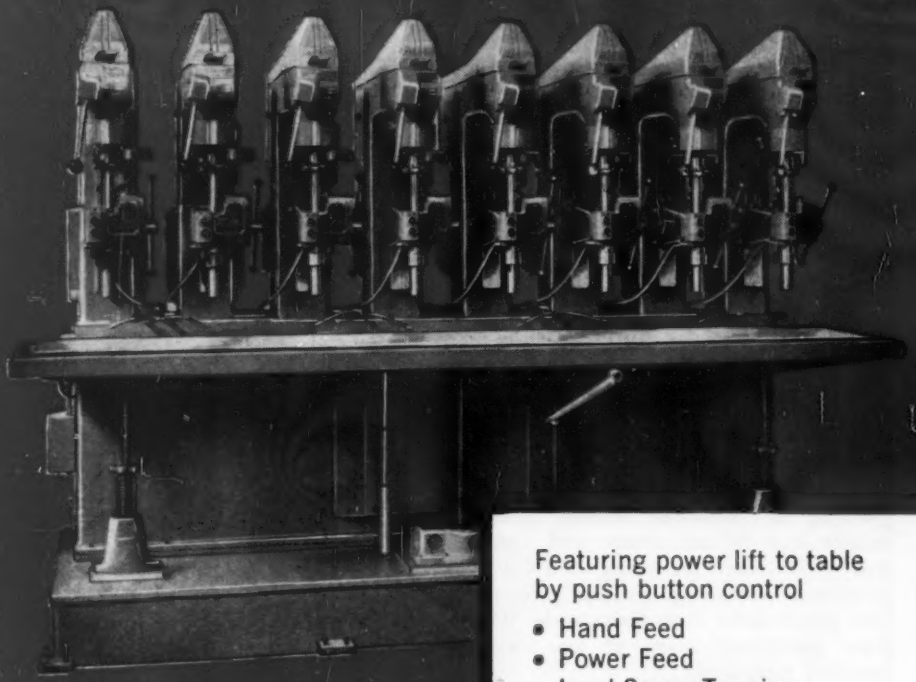
"I'm ashamed of you. Why don't you act like a human being and take it easy?"

more parts...
more operations...
PER HOUR

with...

Avey

SUPER EIGHT SPINDLE
No. 2 BMA-6
DRILLING MACHINE



Featuring power lift to table by push button control

- Hand Feed
- Power Feed
- Lead Screw Tapping
- Four Feeds
- Six Speeds
- Built-in Coolant System

For drilling... tapping... production machines

Avey

THE AVEY DRILLING MACHINE CO., Cincinnati 1, Ohio

George of Georgia. He is one of the best financial minds in the Congress.

Senator Walter F. George of Georgia is expected to head the Senate Foreign Relations Committee.

The Senate Interior and Insular Affairs Committee will probably be headed by Senator Clinton P. Anderson of New Mexico.

Senator Warren Magnuson of Washington is expected to head the Senate Interstate and Foreign Commerce Committee.

The Senate Labor and Public Welfare Committee will be headed by Senator James E. Murray of Montana.

The House Appropriations Committee will again be headed by Dr. Clarence Cannon of Missouri who has held this post several times. The Armed Services Committee of the House will be headed by Congressman Overton Brooks of Louisiana. Representative Brent Spence of Kentucky will be the Chairman of the House Banking and Currency Committee.

Representative Graham Arthur Barden of New Bern, N.C., will be the Chairman of the Education and Labor Committee of the House. Representative Augustine B. Kelley of Greensburg, Penna., succeeds Representative Ralph W. Gwinn of New York as Chairman of the Subcommittee on Education.

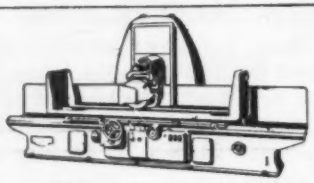
The House Foreign Affairs Committee, one of the most important, will be headed by Representative James P. Richards of Lancaster, S.C. Representative Kenneth Mills Regan of Midland, Texas, will be the Chairman of the House Interior and Insular Affairs Committee. Representative Robert Crosser of Cleveland, Ohio, who was born in Lanarkshire, Scotland, will be the Chairman of the House Interstate and Foreign Commerce Committee.

The House Judiciary Committee will be headed by Representative Emanuel Celler of New York. The House Public Works Committee will be headed by Representative Charles A. Buckley of New York.

The House Un-American Activities Committee, which has been headed conspicuously by Representative Harold H. Velde, of Illinois, passes under the Chairmanship of Representative Francis E. Walter of Easton, Penna. Representative Jere Cooper of Dyersburg, Tenn., succeeeds the distinguished old veteran Representative Daniel A. Reed of New York as Chairman of the House Ways and Means Committee.

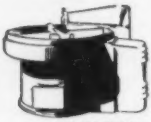
The recent election has given the Liberals 183 Members in the Congress, a safe majority.

"Hmmmm . . . excellent . . . very good . . . yes. . . . Where'd you steal it?"

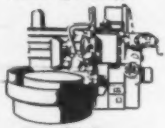


Precision Surface Grinders
Horizontal Spindle

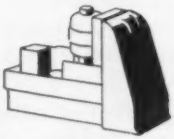
Disc Grinders,
Double Spindle Type



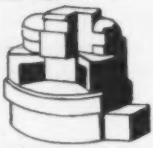
Vertical Spindle
Disc Grinders



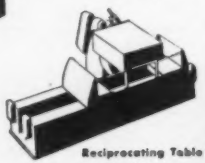
Plane Grinders,
Rotary Table Type



Rotary Table
Surface Grinders

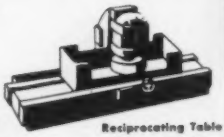


Automatic Rotary
Surface Grinders



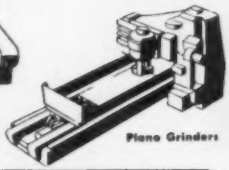
Reciprocating Table
Face Grinders

Disc Grinders,
Single Spindle Type



Reciprocating Table
Surface Grinders
Vertical Spindle

Face Grinders,
Travelling Wheel



Plane Grinders

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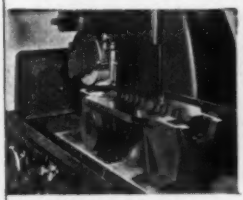
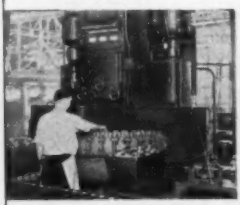
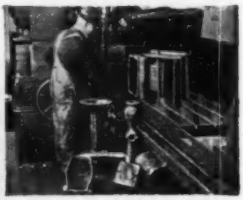


40 hours before — now 4 hours. Pump case ground on Mattison Horizontal Spindle Precision Surface Grinder

120 surfaces of cast iron compressor heads per hour removing 1/32" stock with Mattison No. 24 Rotary Surface Grinder



900 connecting rods per hour, using 40 station fixture to finish grind crank and wrist pin ends of assembled rod with Mattison No. 72 Grinder



Shows variety of work run on Mattison Face Grinders

MATTISON MACHINE WORKS
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Leaders of Thought in Industry

An interview with Arthur F. Vinson, vice president—manufacturing, General Electric Company

Q. Mr. Vinson, we believe the metalworking industry to be interested in how you are solving some of your manufacturing problems. For instance, it is said that General Electric is concentrating on making rather than buying, and that you are reducing the number of companies from whom you buy components.

A. Our basic plan is to integrate as far back as is practical. All large manufacturers are trying to do the same thing.

Q. Controlling the materials and manufacture yourself, from the time the ore is dug until the finished product is on the dealers' shelves?

A. In general, yes, although we have no plans to produce many basic raw materials. The more the integration the better the control and the less the dependence on outside sources. However, I think it is erroneous to say that we are concentrating on making rather than buying components. We are trying to integrate, true, but we are doing it realistically. There's no sense in integrating if it's going to cost us money, or jeopardize quality. After all, there are literally thousands of parts that a supplier can make at a price that we can't even come close to matching.

Q. How do you determine whether to buy or to make? Do you have a program?

A. Yes, we have a plan. We call it Value Analysis. A number of teams, working with engineering, production and purchasing, examine components with a view toward producing them cheaper and better, whether to make or to buy.

Q. Components of a certain kind?

A. No. When the Value Analysis teams were first organized certain items stood out as needing re-examination and the teams concentrated on those, but now all parts are being analyzed.

Q. Even those you produce yourself?

A. Yes, the teams are studying our production with a view toward finding whether it is cheaper to make or to buy. We've found some surprising things. Many parts we are making we have no

business being mixed up with, they should be bought; others, now being bought, should be manufactured here. The Value Analysis teams examine everything from design to materials to production. For instance, we used to purchase a wire spring which cost us $11,000 a year. The team found a spring, just as good, for $3,000 a year. This particular study reduced the cost of making this particular part by 25 percent.

Q. How much money do you save each year as a result of the team's work?

A. Our operating departments estimate the savings run into millons of dollars per year.

But to return to something mentioned earlier: We are not trying to reduce the number of our suppliers merely for the sake of reducing and for the fun of making components ourselves. We are analyzing our operations from top to bottom. I don't think enough analyzing of operations has been done by the average manufacturer. A lot of money and time could be saved if more analyzing were done.

Q. From how many suppliers do you buy components?

A. I would say around 17,000 manufacturing suppliers. This does not include services and other related small businesses. It is interesting to note in relation with our Value Analysis plan that the number of suppliers has actually increased instead of decreased.

Q. Offhand, do you know the value of equipment and facilities purchased during 1954? Also the value of materials, and supplies?

A. Our fiscal year does not end until 1955 so I cannot tell you exactly. In 1953 we spent $141,046,000 on new plants and new equipment. Value of materials and supplies amounted to $1,484,605,000.

For the fiscal year of 1954 we set aside $175 million dollars for facilities and equipment, an increase of over 24 percent over 1953.

Q. Do you plan to keep up this pace in 1955?

A. While no figures are available, I would say our expenditures will approximate this rate for 1955. You see, in the years between now and 1964 we expect to double our volume of goods produced. Yet if we continued to progress at the rate we have in years will achieve only a 34 percent increase, so that we are forced to accelerate our historical rate of progress.

Q. And your Value Analysis Plan is a cog in this acceleration?

A. Yes, but only one phase of it. We're relying on manufacturing research, development of new methods and equipment, product standardization and mechanization of processes.

Q. This includes the use of special machines?

A. Wherever special machines can be used profitably we will use them. Again, it is a matter of analyzing requirements and present methods. Sometimes a special machine can be used even though it appears at first impossible. We make a large number of control boxes, with every box a different size. There must be about 500 of them. We analyzed the problem with a view toward finding a machining method which would run automatically or to which an automatic line could be adapted. There was no way

whereby this could be done until we analyzed the boxes themselves. By making a number of design changes, we reduced the number of boxes and put them on an automatic line. Now about 80% of them are produced through this method. In this case special machines helped us tremendously.

Q. Do you consider the use of special machinery on the basis of number of parts or on production time?

A. Principally production time. The number of parts has some bearing on our decisions, of course, but time is the determining factor.

Q. Do you have any form of pay-off period for both standard and special machines?

A. No. Each machine is judged on its own merits. Too many variable factors enter into it. I don't care how long a machine is in use and how long it is idle so long as the pay-off period is reduced and cost per unit is decreased. One of the worst production thoughts is the one that says a machine must be turning in order for it to make money. For example, if you have four men and four machines working for one year on a run, why not buy a special machine, use one man and the machine for three months and get more production than formerly? The machine can stand around for months and still have earned its keep.

Q. Do you have a regular replacement program?

A. We have no formula and we haven't been too scientific. All equipment is reviewed continually in each department and purchases made if we can reduce our costs.

Q. Is any of your equipment replaced with the aid of the accounting department? I'm thinking of the accounting end of depreciation.

A. Every decision is based on production. Accounting only furnishes the financial data. If it is unprofitable to operate a machine it is replaced whether it's served two, five or twenty years.

Q. How do you purchase capital goods?

A. There is no one individual who has charge of this. The superintendent of the department, and his manufacturing engineers, decides what type of machine is required. He works with the purchasing department. If it is a standard machine tool he gives the specifications to purchasing, who then get quotations on this particular type of machine, or equivalent types.

Q. Except where the machine is of a type made only by one builder?

A. Then purchasing merely sends out the order without getting quotations.

"Sharpening my scissors?"

Q. Do you do any rebuilding?

A. Yes. Where improvements in a class of machine tools have been static and where the improvements are such that we can incorporate them ourselves into rebuilt machines. Usually we can put a little more beef into them and adapt them to carbide use and have a machine that performs as well as though we had bought it new. However, we can't do this where a machine tool builder has made positive improvements by way of automatic cycling, hydraulic controls, variable speed drives, etc.

Q. General Electric is competitive within itself, isn't it?

A. All General Electric departments buy from one another competitively. Each department has its own profit picture and it's not going to jeopardize it by buying equipment from another General Electric department if it can get a better price elsewhere. Take the case of hermetically sealed motors. While we make them for many manufacturers of refrigerators, our refrigerator department must purchase them on an open market basis along with everyone else.

Q. There has been talk that the big manufacturers are getting bigger and the smaller are getting fewer.

A. I don't believe it, at least not in our industry. There are more manufacturers of electric motors now than ever before, doing a fine job and making a good profit. They may be small but their competition is keen and we have to hustle right along. This is true of almost any industry with the exception of the automotive industry. But in the appliance field, steel, and general manufacturing, the small businesses are growing and doing a bang-up job.

Q. To return to your suppliers, those whose products are being analyzed by your Value Analysis team: How can they compete against a large organization like General Electric if you decide to manufacture a part yourself?

A. If we decide to manufacture a part ourselves it would appear that they have already been unable to compete or we wouldn't be able to produce the part ourselves. While many suppliers have kept pace with new methods and new techniques, others have not. I think the smaller manufacturer can compete by better analyzing his operations. He must exert better production ingenuity and use more standardization. He must keep pace with new tools. Certainly, he has the competence and with it the advantage of directing that competence on one specific problem, whereas we have thousands of problems and our competence is consequently spread pretty thin at times. But I think it is wrong for a moment to assume the smaller manufacturer cannot compete if he puts his mind to it, for he most certainly can. But he's got to be awake and progressive.

Let me give you an illustration. We used to buy a lot of bronze timer gears at 20½ cents a piece. A nylon gear costs 2¾ cents a gear; consequently, someone lost out on a lot of bronze timer gear business. Yet there was nothing to have prevented the original supplier from having advanced the nylon gear substitution. This is, of course, a radical example, but it shows that if a supplier will put effort behind cutting costs he can do so. In all probability we couldn't compete even if we wanted to make the part ourselves.

Q. Of all the problems which beset industry, which do you think is the most pressing?

A. From our standpoint, and judging from what I've seen in other industries, the most pressing appears to be production control, or what may be termed the business end of production. We've made tremendous strides in mechanical techniques, in plant layout, in material handling: In plain, getting the job out of the door. But industry hasn't done too well with production controls, tool control and job standardization. I suppose one reason for this is that you're dealing with a human element which is lacking in the pure mechanical end of the business. I realize that production control is a broad subject and has many phases and I'm speaking of the over-all picture.

Q. What are you doing about the subject?

A. We've been working on it right along. Again, we're analyzing the operations and the processes. It's too early to say exactly what we are accomplishing except that we're hopeful of licking the problem and that definite progress is being made.

Q. While General Electric is very strong on research, has anything been done on the subject of production research?

A. We are now building a new metallurgical laboratory which will be completed in the near future. We are even now analyzing our materials and doing our own research work. Some of our problems involved special kinds of steels in small lots. The major steel producers cannot go to a lot of trouble for us in research work because of the small quantities we buy, so we are doing our own research.

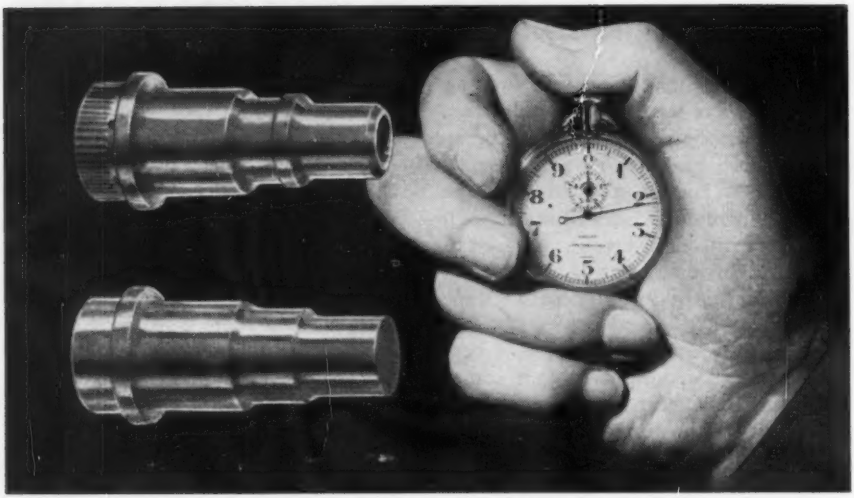
We also have a machinability laboratory which is headed by Dr. Gilbert. Their function is to analyze machining operations, machine tools, metal removal practice, and all the various phases that come under machinability. Their work is going forward with gratifying results. As soon as they come up with an idea it is passed on to the production department and put into practice on the line. Their work is specialized in so far as it concerns our operations, true, but it is impossible to peg research down. They must have a broad field in which to roam though the practical application appears to be remote; however, sooner or later, their work is used to definite advantage. They've been a big help to us.

Q. Do you believe in sharing the results of your metallurgical and machinability research with general industry?

A. General Electric has always believed in one thing: professional responsibility. We believe that we have a duty toward our industry and toward our society to make available those new ideas which will help industry or society. We cannot bury our new ideas. There must be free interplay of ideas, techniques and the results of research between all industries. After all, the man who develops the idea will reap the first benefits. At the time he passes them on to the next man he will be, or should be, if he's a leader, working on improvements. Yes, indeed, we are earnest believers in our professional responsibility.

Q. How does General Electric feel about the future?

A. We have never been more optimistic. We plan to produce as much in the next ten years as we did in the last 75. There is a magnificent spirit in our company and we view the future with great confidence.



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A Diemaker Looks at Plastic Tooling

By **Bert Jones**
Superintendent
Vulcan Tool Co.
Dayton, Ohio

MUCH has been written concerning the ever increasing use of plastic tooling. Since good die practice must be followed regardless of the material used, good tool and die makers should be consulted if the production plant believes it can save tooling money by using plastic tools. By good tool and die makers we mean those tool builders who have the ability and experience to produce plastic tools and know when and where to say "no" to certain applications.

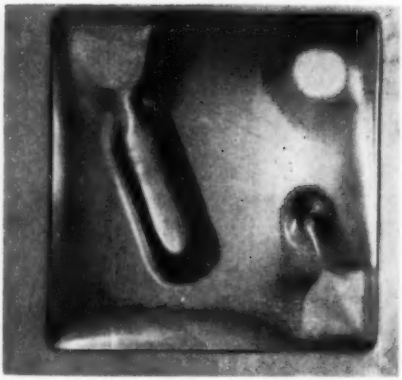
As die makers we must not fool ourselves about plastic tooling, since the art is comparatively new. But such tools are here to stay and it is up to the qualified tool and die company working with the plastic industry to improve and expand plastic tooling for the benefit of industry in general.

We have many die examples built in our toolroom for drawing and forming. Some of these dies were built for low production, prototype and experimental purposes. Figure 1 shows a part from a plastic die that was built for development only, but proved so successful in production no steel die was necessary, saving a considerable amount of money.

Tool men will readily recognize the spot weld fixture in figure 2 which was made from a finished stainless steel part to which different parts were to be spot welded. This particular fixture was a replacement of a worn out aluminum fixture shown with it. By taking a finished part and developing a laminated plastic shell over it, ma-

chining out slots to locate individual pieces for spot welding, attaching holding clamps to the plastic fixture, a very inexpensive tool was produced for 10,000 parts.

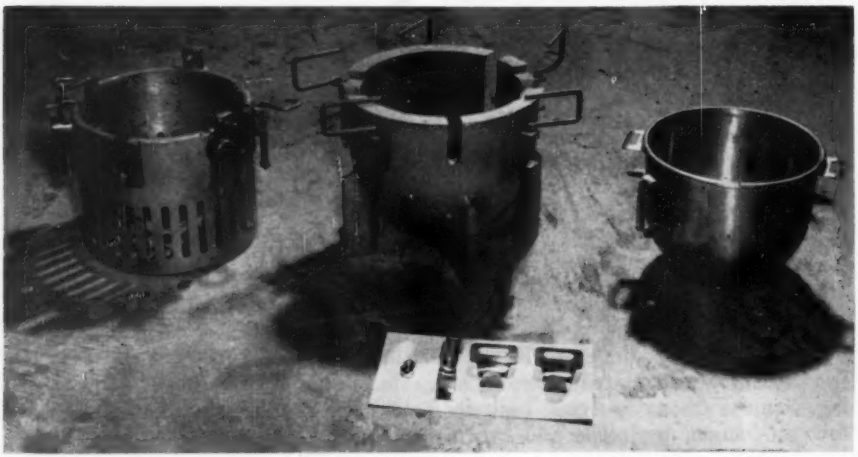
Many times in a tool program it is necessary to develop fixtures or gages with contours which are used also to check finished parts, figure 3. Into these fixtures, at times, magnets are inserted to hold down the finished part. This is possible when a fixture is made of metal or some other material into which a magnet can be inserted. It is possible to take a model, though, which may have a considerable contour, and from this model develop a fixture over which a finished stamping can be checked for dimensions necessary to its tooling. This has proved most practical in the fabricating industry and is the least expensive method for final inspection of finished parts where you relieve for



1. A good application. This was a preform die with generous radius, material 20GA enameling iron. In building the punch and die no machining was necessary.

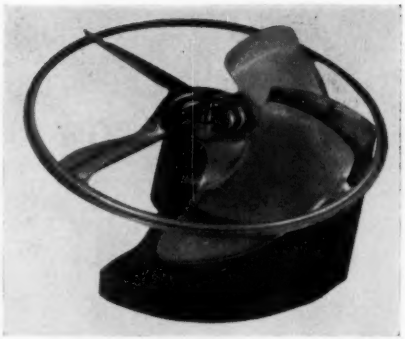
Epoxy Resin reinforced with Fiberglas was used. The draw ring was alloy iron. In developing, so the final draw would not fracture the metal, we were able to remove stock and patch three different times in a few days.

2. A spot welding fixture. On the left can be seen the original aluminum fixture, in the middle is the plastic shell. A very inexpensive tool was produced for 10,000 parts. In the foreground are the components to be welded to the piece part.



tabs and for checking contour and size. Such a plastic fixture will do the same job as one that has been Kellered.

Figure 4 is a group of semi-steel and aluminum castings which were to be used in tooling for different phases of production. These castings were to be drill jigs, check jigs and gages and were of such contour that it would be necessary to either hand spot these pieces to a plaster cast or to Keller to a model. Rather than complete this program using this type of casting, we found it advisable to take the original models which were accurate in contour within .005" and to develop plastic fixtures from them. No finishing of contour was necessary and at the same time it was possible to locate from these original models holes and various component parts which were then inserted into the finished plastic fixture. Such laminations were built up to a thickness of ⅝".



3. Plastic checking model for fan blades.

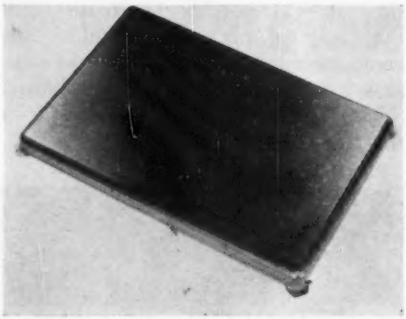
Figure 5 shows a group of tools which were developed and finished in their entirety of plastic. You will note in this picture that there are steel bushings inserted into the plastic and that the plastic tools have steel edges cast into the plastic. These bushings were not

4. Semi-steel and aluminum castings were to be used for drill jigs and check gages. Keller and hand operations would be necessary to complete these tools.

5. Shows some of the same tools with drill bushings inserted. Also, some with steel inserts around edges. It requires 1200 p.s.i. pressure to press out the bushings.

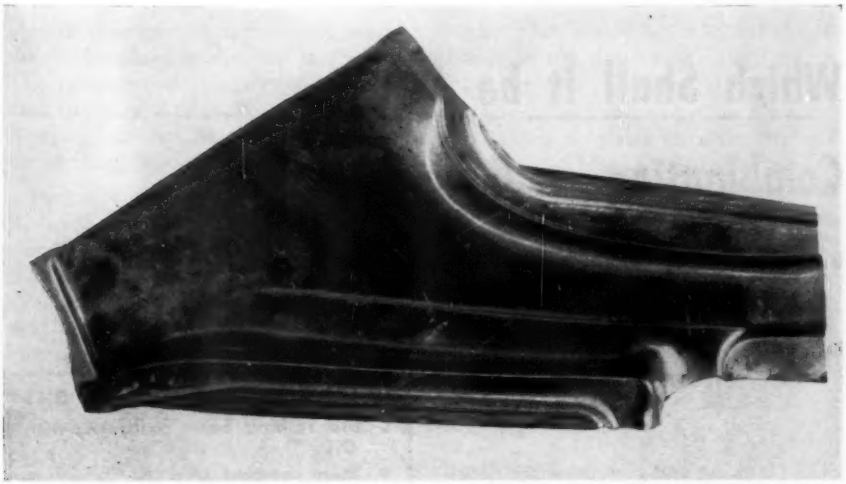
set into the original plastic laminations, but oversize holes were bored through the finished plastic, bushings were located over shoulder pins in the original model and the plastic fixture was then put over the model. Plastic resin was floated around the knurled bushings and was allowed to set. The shoulder pins were pulled through the bushings to remove the fixture.

Setting the bushings by this method guarantees that any distortion in the original curing of the plastic fixture, which might occur, will not affect the tolerance of these bushings in their location. It requires 1200 p.s.i. pressure to press out these bushings. Excessive heat will break down the plastic laminations around the bushings for easy removal and replacement. Where this bushing is not pressed into either a reamed or a ground hole, it may appear elongated and may need to be lapped out one or two-tenths to bring it up to dimension.



6. Not a good application. No difficult contours which would require expensive machining.

Please note figure 6 which is not considered a good application for plastic. The part is approximately 3″ deep, 24″ wide, and 38″ long. A nice straight panel, with no difficult contours and no expensive machining involved. If the parts were produced from plastic dies, such dies would cost approximately 20% more than if material were



7. This trim part with sharp distinct lines is not a good draw die application. Material: stainless steel, 24 gage. Marks or scratches were not allowed so plaster holding and knock out pads were used on trimming and cam dies.

iron or steel, flame hardened. But hear this—if machine time is scarce or quick delivery is necessary, plastic can be considered since the draw radius itself is favorable.

The elimination of Kellering, spoting, barbering and try-out hours represents huge savings to the buyer of special tools, and more and more the experienced die manufacturer must realize the tremendous potential for plastic parts in dies such as locators, pressure pads, knock-outs and so on.

All-plastic dies for medium or high production runs can be considered provided good die maker common sense is used. After all, don't forget that reinforced plastic dies with steel inserts are not necessarily stand-by, short run stuff. In many instances steel or cast iron dies need protection against wear and so does plastic.

There are many plastic materials available and your experienced plastic die maker selects the material most suitable for the job at hand, the same as selecting the correct steel for a hard die. Your experienced plastic tool source will know whether the die, tool or gage should be plastic, steel, or plastic and steel.

The End

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Which Shall it be . . .

Combination or Compound Dies?

By **W. C. Betz**

FOR blanking and piercing large diameter sheet metal rings of thin stock, compound dies offer many advantages over combination dies.

Comparative first cost of tools is slightly in favor of combination dies but blanks from compound dies have bores concentric with the O.D., while with combination dies the bores are never exactly concentric due to difference between pilot and bore diameters and locating of the pilot in the bore while blanking takes place.

Another advantage in favor of compound dies is their more compact size for a given piece of work. Tools can be made on smaller machinery, especially the boring and grinding of holes, and die parts are much smaller for heat treating safety and convenience.

In the layout of a blanking and piercing die of large size as shown, the boring of the blanking and piercing holes presents a problem unless very large swing lathes or boring mills are available. For grinding these holes you need large swing internal grinders. Still another advantage of compound dies is die life.

ADVANTAGES OF COMPOUND DIES

- **Blanks have bores concentric with O.D.**
- **More compact size**
- **Can be made on smaller machines**
- **Die parts are smaller for heat treating**

DISADVANTAGES OF COMPOUND DIES

- **Higher first cost**
- **Material cost may be higher**
- **Resharpening cost**
- **Disassemble die for cleaning**

Compound dies of the type shown, used to produce blanks of large size, can be made on much smaller standard machine shop machinery. Material cost, however, might be higher on compound dies due to the cost of a die set, but if pillars are used on combination dies the cost will be about the same as for compound.

Resharpening may cost more for compounds due to the necessity of taking the die apart to clean out grinding dust after sharpening. In either case presses should be equipped with automatic feeds.

Another definite advantage of the compound die: Blanks will always be

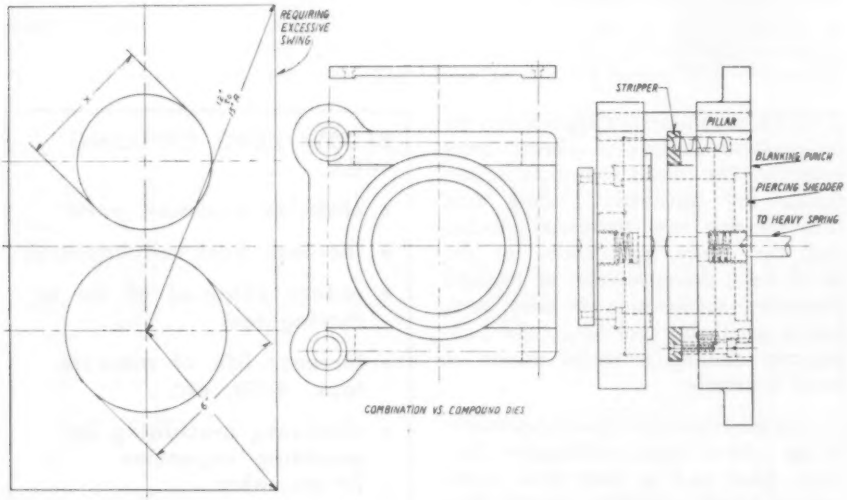
a given diameter throughout the life of the die because the die wall is straight. The combination die must have clearance in the bore to prevent blanks from clogging; as the die is ground down, the opening becomes larger.

Piercings from the compound may be made to pass through the blanking punch in which case the opening will require clearance. By making the bore in the blanking punch straight the slug may be shed at the face of the die and blown out of the back with the finished work. This shedding arrangement is shown in the die layout.

Blanks from compound dies have both inner and outer burr on the same side which at times is a decided advantage, also blanks will be flatter due to ironing between the blanking punch and the shedder in the die section. Blanks from a combination die are nearly always slightly dished.

In either case, presses should be equipped with automatic feeds.

The End



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Below Zero Chilling Toughens Metals, Increases Tool Life

By **Victor Morris,** Assistant Editor

THERE are numerous applications for temperature chilling in almost every industry. The metals industries in particular are constantly finding new uses for this new industrial process, and the many applications in the metal field, decomposition of retained Austenite, stabilization of alloy steel, longer perishable tool life, make temperature chilling a useful means of metal treatment.

This treatment is of great importance in the field of metal stabilization. Precision parts such as lathe beds, ways, gauges, arbors, mandrels, engine parts can be quickly and effectively size stabilized. The growth associated with parts tempered by conventional means is eliminated.

For complete and proper stabilization, complete transformation of Austenite to Martensite must be produced. If a partial transformation takes place (as in the case of most ordinary treatments) the retained Austenite may produce dimensional changes as the part ages. Subjecting parts to repeated cycles of heating and chilling will complete the transformation.

BELOW ZERO CHILLING WILL . . .

- **stabilize precision parts**
- **increase Rockwell hardness**
- **reduce chipping of die or cutting tool**
- **increase life of reamers, taps, drills, etc.**
- **eliminate machining by providing expansion fit assembly**

Final finishing of the part should be done after this transformation is complete. A part that has a complete Martensite structure is larger because the Martensite grain structure is larger than that of the Austenite. The final drawing tempers the Martensite and

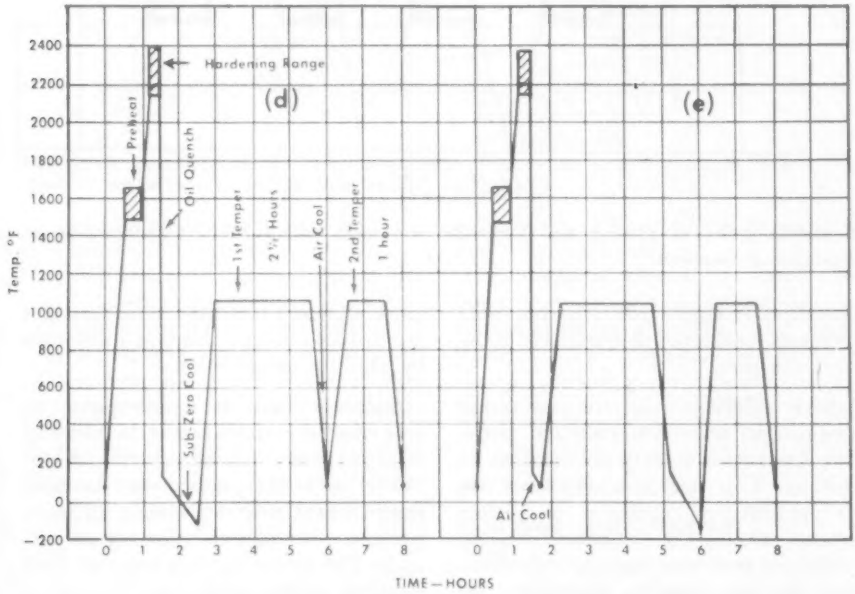
relieves the stresses. Subsequent changes in size are impossible. Stabilization is complete and the part may be finished and used. Researchers have found that stabilized metals—metals which have undergone chilling during heat treatment as described here—can be expected to increase in Rockwell hardness by about one point.

The scope of ultra low temperature stabilization is illustrated by these examples of various metals which have successfully been stabilized.

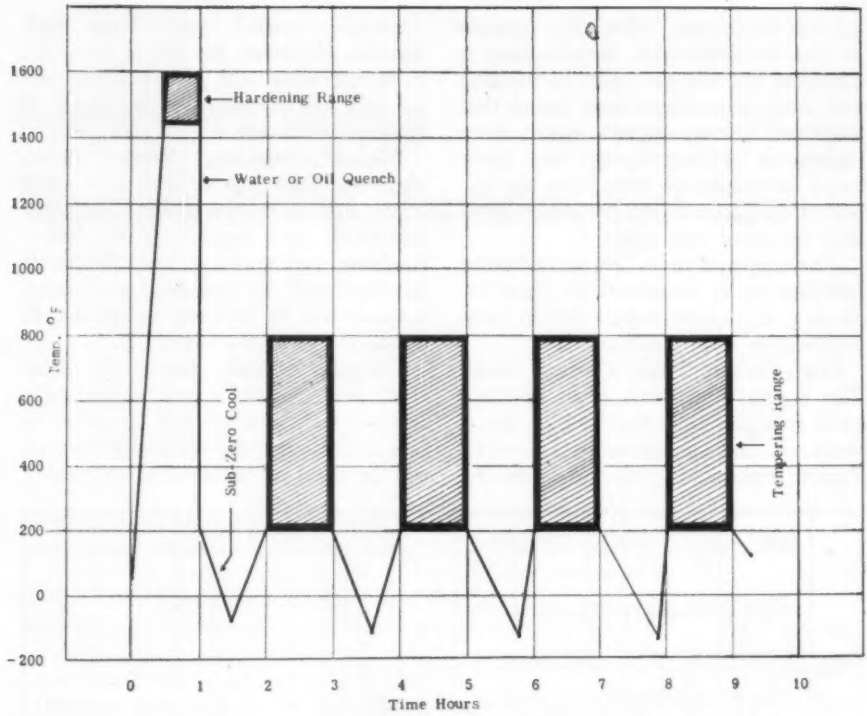
High-Carbon High Chrome Steel. The transformation point of these steels is higher than that of high speed steels. A low temperature of —100 degrees Fahrenheit will transform the Austenite carried over from each quench. However, the use of a —120° F. temperature will give a safety factor and will therefore be beneficial to the part stabilized.

Nickel-Carburizing Steels. When steels of SAE 3312, 3115 and 2000 series are carburized, hardened and tempered, and found to be below hardness specifications, the Rockwell hardness will be improved and stabilization will be effected by cooling to temperatures below —100° F.

Tungsten Shock Steels. If these steels are Rockwell tested immediately following the quench and found to be low in hardness, the chilling treatment can be applied before any tempering



Typical cycles of heat and low-temperature treatment of high speed and moly type steels. (D) illustrates cycles for average work. (E) illustrates cycles for large tools with complicated sections, or sharp corners and edges. (Chart courtesy of H. C. Amtsberg and Machinery).



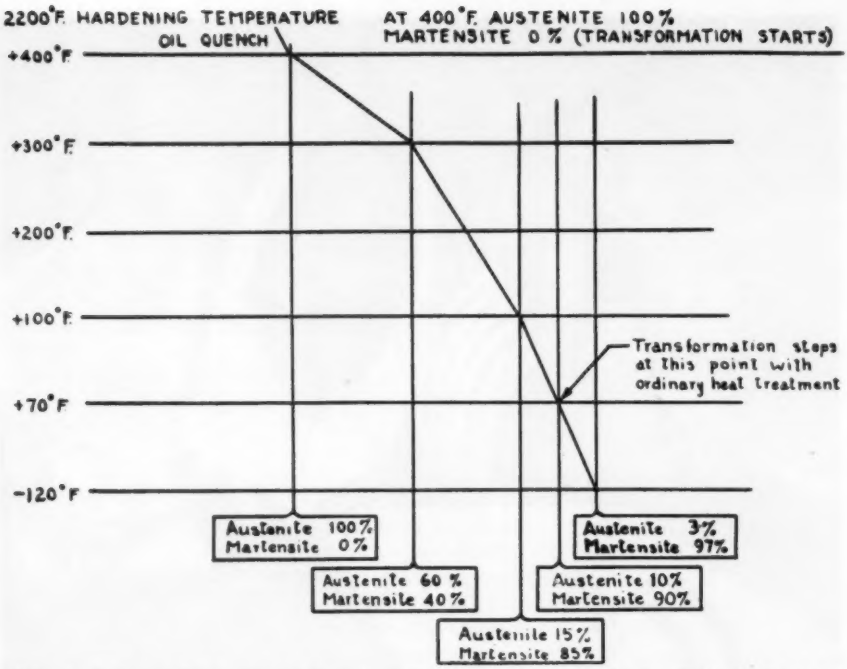
Repeated cycles of chilling and tempering are used where 100% transformation of Austenite is required.

operation is employed. This not only increases hardness but effectively stabilizes the part.

SAE 52100. This steel is rather sluggish in transformation and therefore lends itself to easy stabilization by chilling. This steel is used extensively in applications requiring very close ground or lapped tolerances. Stabilization by means of chilling will eliminate the size changes encouraged by standing at room temperatures or by variable atmospheric temperatures such as in high flying aircraft. Excessive wear, seizing or complete failure of parts subjected to atmospheric variables are reduced to an absolute minimum by chilling stabilization.

Stainless Steel. It is interesting to note that the stabilization by chilling of Type 440-C stainless steel (AMS-5632) is now specified as standard practice by USAF for almost all parts made of this material, for use in aircraft. The following is a copy of their standard specifications.

1. Heat treat as specified.
2. Chrome plate as specified.
3. Immediately following plating, heat to a temperature of 390° F.



This chart shows the curves of transformation of Austenite to Martensite in high speed steel at temperatures varying from —400° to —120° F.

to 410° F. for a period of two and one-half to three hours.

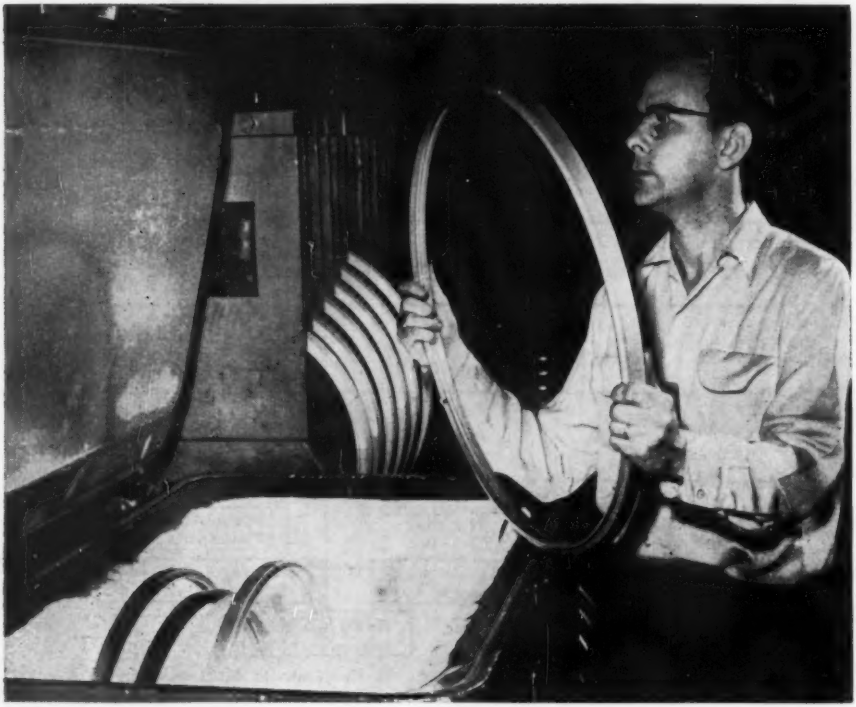
4. All machine dimensions to be held after plating.
5. Grind to size as specified.
6. Stabilize by lowering temperature of part to —120° F. Hold that temperature for 1½ hours. Allow part to return to room temperature in still air. Heat to 400° F.; hold at temperature for 1½ hours. Allow part to return to room temperature in still air.
7. Lap and code.

Other Metals. Other metals, and cast iron, are among a few of the varied metals that have been successfully stabilized by chilling. In the case of these metals, all internal stresses and strains are relieved. They are thus normalized and fully stabilized.

Non-Ferrous Metals. It should be noted that in the case of non-ferrous metals, such as aluminum and magnesium alloy castings, no physical change in the grain structure is effected by chilling. In the case of these metals all internal stresses and strains are relieved. They are thus normalized and fully stabilized.

Perishable Tool Treatment

The chilling effect produced by Sub-Zero industrial chilling machines has proven in production processes to be invaluable in "conditioning" tool steel. The general pattern of treatment of high speed steels, tool steels, dies and



Shrink fit assembly is the purpose of this application. The materials are jet engine compressor rotor wheel spacer rings, couplings and pins. The metals include aluminum and steel rings. The parts treated in this unit are a series of 11 graduated spacer rings, ranging in diameter from 20.5" to 25". These spacer rings are shrunk to fit the tapered shape of the jet engine compressor rotor wheel which is part of the turbojet engine. Nine of the spacer rings are aluminum and two are steel. The type of steel is classified information. Among the advantages of this installation, the manufacturer noted that "cold does not affect the parts whereas the old method of heating distorted and warped them."

gauges of ultra low temperatures involves cycling—alternately subjecting the parts to temperatures of —120° F. and to a draw or stress relief at conventional draw temperatures. The number of cycles is dependent upon the chemistry and end use of the steel so treated. Sub-Zero cold treatment is not a substitute for heat treating but should preferably be done during or following heat treatment before the tool, die or gauge is ground to final dimensions.

Chilling eliminates the retained Austenite and modifies the metal microstructure. This reduces greatly

the chipping along the cutting edge of a die or cutting tool, which results in more cuts between grinds and longer life.

Laboratory tests conducted at the Massachusetts Institute of Technology and in industrial plants have definitely established that it is possible to increase Rockwell hardness of high speed steel and tool steel, and at the same time increase toughness by chilling treatment basically similar to that outlined below.

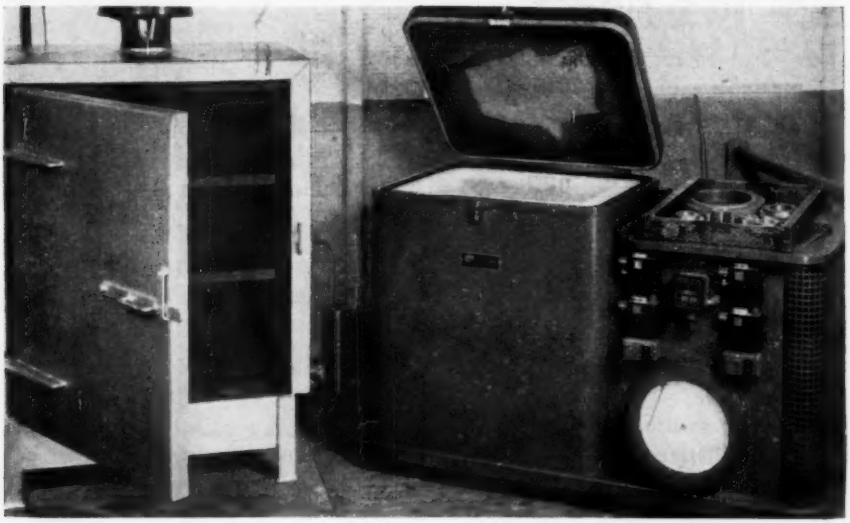
Some of the most spectacular increases in tool life and performance have been recorded on standard tools such as taps, reamers, drills, cutters, etc., that have been in stock for some time. These tools, when given multiple cycle chilling treatment, have produced many more cuts per tool than before treatment.

Some Standard Techniques for Cold Treating Tool Steel

Water Hardened Die Steel

1.—Heat to 1500° F. (or usual method).
2.—Quench at 75° F. (or usual method).
3.—Immerse at once in Chiller at —120° F.

The Farmington Engineering Co. of West Hartford, Conn., stabilizes gauge steels with this unit. Materials used are special alloy steels and carburizing steels in the manufacture of ring and other type gauges. This chilling unit user cycles gauges through two hours at —120° F., and then two hours in a low temperature oven at 250° F. As many as three complete cycles may be used, depending on the need for relatively absolute stability in the gauge steel. This process also increases the strength, ductility and hardness of the gauges manufactured by this firm. This company states: "Gauges are noticeably more stable" after being chilled.



Machine tool wear strips 16 feet long are chilled to —120° F., after flame hardening. Material is 91140 graphite steel.

4.—Draw as usual (if drawing temperature exceeds 875° F., then again immerse in Chiller at —120° F.)

Finished Products, All Types Steel

1.—Heat to 300° F. in tempering furnace or 212° F. in boiling water.
2.—Cool to room temperature.
3.—Immerse in Chiller at —120° F.
4.—Warm to room temperature.
5.—Repeat cycle 4 to 6 times.

High-Speed and Moly Type Steels

1.—Pre-heat as ordinarily done.
2.—Heat to hardening temperature.
3.—Quench (oil, water or salt brine, etc.)
4.—Allow to cool approximately 150° F.
5.—Chill to —120° F.
6.—Allow to return to room temperature.
7.—Draw as usual.

Expansion Fitting

A highly important and practical application is in the field of expansion fitting. Here are the definitions of terms to explain "expansion fitting" and "shrink fitting"; Shrink fitting means that the female part is heated . . . as it cools it shrinks to a fit; press fitting involves the assembly of male and female parts by pressure, or force; expansion fitting means that the male part is cooled. It is inserted into the female part and allowed to expand into fit. Therefore, chilling involves "expansion fitting."

These are the advantages of below zero chilling in fitting parts:

1. Cleaning and finishing after fitting is eliminated. Chilling gives complete freedom from oxidation "scale" caused by heating. There is no possibility of alterations or changes taking place which would alter the parts being fitted physically.

2. Distortion caused by heat is eliminated. Heat gradually increases the possibility of distortion . . . cold has no detrimental effect whatsoever on the parts.

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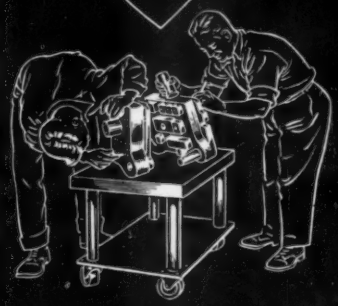

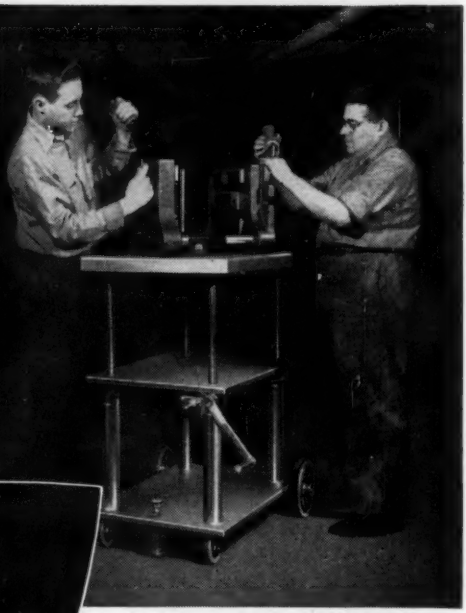

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Electronic resistors, destined to become parts of control components for jet aircraft engines, are tested in this unit. Though the resistors have all been tested prior to acceptance, they are thoroughly checked on receipt because the life of a man and a plane depend on their performance. They are first tested to be sure they operate within specified tolerances as low as .1%. Then they are subjected to three alternate hot-cold cycles, down to 60 degrees below zero in this unit, and up to 125 degrees above zero. Again, they are tested, and if they still hold to required tolerances they are passed for use in jet engine control components. This unit measures 18" x 30" x 33" deep and has a thermal capacity of 800 btu/hr. at 70 degrees.

Details on various applications of this Bendix Aviation Corp. testing unit cannot be revealed for reasons of military security. However, it can be noted that it is being used generally to shrink parts for press fit assembly. For example, components of the fuel pumps for B-36 bombers are shrunk by chilling prior to assembly. Assembly by hand then results in a tight fit as soon as the parts return to room temperature. This unit measures 30" x 18" x 33" deep and has thermal capacity of 2000/2000 btu. Temperature is adjusted to —120° F.

3. Cold parts are much easier to handle. Expansion fitting can be done with hand pressure only. The use of arbor presses or pounding is eliminated and also the distortion and spoilage of parts often caused by pounding.

4. A firmer bond between fitted parts is established, since parts can be almost the same exact size in view of the considerable contraction of the male part effected by chilling. Tests show when the chilled part has expanded back to natural size under room temperature it is fitted securely enough to withstand pressures ranging up to 10 tons.

It is not necessary to machine or otherwise finish parts that have been expansion fitted. Whatever the part, it may be placed in the chilling unit in finished form, chilled as long as necessary and inserted into the female part.

5203-R

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CALCULATION OF METAL SHRINKAGE

The approximate shrinkage of rings or cylinders 2" in diameter, chilled from 70° to —70° F. and to —120° F., varies with the metal as shown below.

	—70° F.	—120° F.
Tool steel	.0016	.0026
Phos. Bronze	.0024	.0036
Alum. Bronze	.0024	.0036
Brass	.0028	.0040
Aluminum	.0034	.0046
Magnesium	.0034	.0047

(Other diameters shrink proportionately)

For quick and conservative calculation it is generally the rule that tool steel will shrink approximately .001" in the —120° chilling unit for each inch of diameter. With aluminum and magnesium, approximately .002" shrink per inch of diameter. These same dimension changes can be obtained by 200° F. rise in temperature.

Other uses of sub-zero chilling today include numerous applications in chemistry, biology, pharmaceuticals, plastics, petroleum and in parts and material testing. While these are not of primary concern to the tool engineer, it may be of interest to cite briefly a few examples.

A manufacturer of Navy and Air Force gyros used sub-zeroing to dehydrate hydrogen and helium used in the instruments. The gases are pumped through 225 feet of coils in the ultra-low temperature unit at a temperature of —135° F. All moisture is literally frozen out.

A manufacturer of control components for jet aircraft engines cycles all electronic resistors three times between —60° F. and 125° F. above zero. After these cold-hot cycles, the resistors are tested for operation within required tolerance of 0.1%.

Another example, several manufacturers of inverters chill the units at sub-zero temperatures for three hours and then test them to determine their electrical characteristics.

Thus, today, in almost every industry, there are many applications for temperature chilling treatment. The metal industries in particular are constantly finding new uses for this new industrial process.

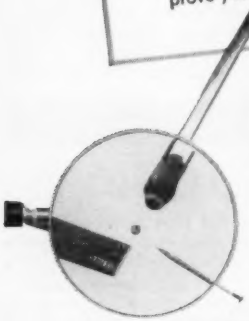
The End.

"Yup, he's come along. Started on the ground floor with this company."

PRECISION GEARS

YOU who use small gears, (to 6" O.D. of the gear blank) can improve the performance of your product, through increased gear precision, without sacrifice of gear production.

YOU who use small, fine pitch, precision gears can increase your gear production without sacrifice of gear accuracy, or improve your gear accuracy without sacrifice of gear production.



The Hamilton Precision Gear Hobber, the hobber with a "reserve of accuracy," regularly holds work spindle and hob spindle runout to less than .0002", workspindle and tailstock spindle alignment to less than .0002", and this workmanship is maintained throughout the machine.

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For small diameter holes, Barber-Colman Solid-Fluted Reamers provide maximum flute strength, quick chip disposal, precision control of roundness and size — and finish that in many cases eliminates lapping. Maximum chip clearance with strongly supported cutting edges provides rigidity and free cutting action for reaming holes to extremely close tolerances. All basic styles and types are included — Precision Jig Boring, Expansion, Taper Reamers, Oil Feed Reamers, Chucking Reamers and Solid Line Reamers.

These features mean better, faster results, with less cost per hole machined. Ask Barber-Colman reamer engineers to assist on your reaming jobs, or send tool and part prints for recommendations.

Custom Built to Fit Special Reaming Problems

Years of experience in testing and designing reamers for maximum performance under a variety of conditions have permitted Barber-Colman engineers to specialize in the manufacture of custom tools to fit special reaming problems. Tools are designed for special conditions of size, finish, tool life, production, or to adapt a reamer to a particular part or machine. Cutting flute profiles, clearance angles or flute design are applied to meet the specific condition.

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Barber-Colman reamers are sharpened by conventional methods on any standard cutter sharpener. For easier sharpening, with positive mechanical duplication of cutting form and clearances, Barber-Colman also offers the Automatic Reamer Sharpener. This semi-automatic method of precision sharpening is particularly desirable for high production reaming applications to assure hole-to-hole consistency.

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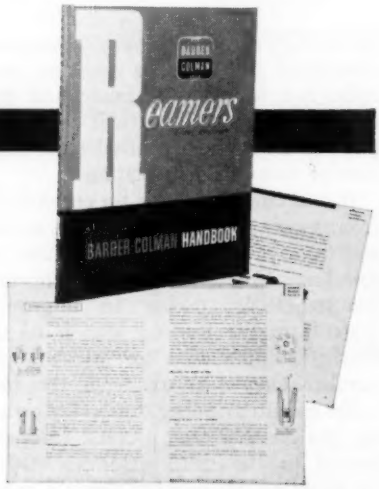

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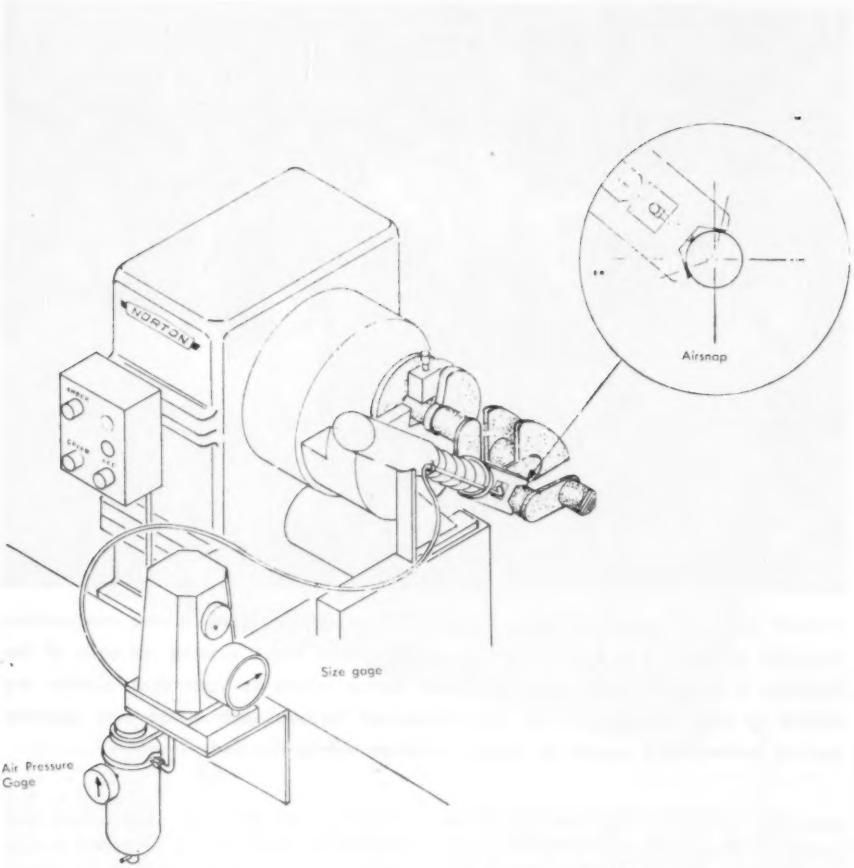
Automated Crankshaft Pin Grinder With Estimated Production of 45 to 60 Per Hour

NORTON'S completely automated crankshaft pin grinding machine, basically, is a four-station, four-wheel machine for V-8 crankshafts. It can be applied to six-cylinder shafts by the addition of two grinding stations.

It is arranged to pick up crankshafts from a conveyor line or loading station and transfer them into the machine for grinding. Five transfer heads operate simultaneously, taking an unground shaft from the loading station to the first grinding station for grinding pin number one; a crank from the first to the second grinding station for grinding pin number two; a crank from the second to the third grinding station for grinding pin number three; a crank from the third to the fourth grinding station for grinding pin number four; and a finished crankshaft from station number four to the unloading station back on the conveyor line.

In addition to the lifting hooks, each transfer station contains a locating hook for rough orienting a shaft angularly. When a shaft is deposited in any grinding station, a rotating cam locates it longitudinally in front of the grinding wheel and a locating arm adjusts it angularly to the proper position of angularity to grind the crankpin. The final angular location is by a locating pin which engages a hole in the crankshaft flange.

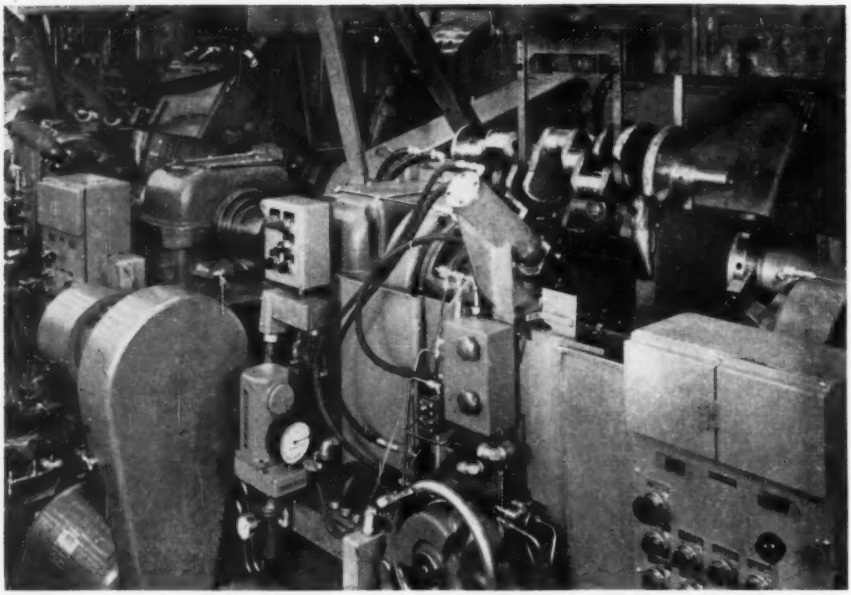
Each grinding wheel is equipped with a completely automatic truing mechanism which will true the wheel face and the radius at each corner. Automatic compensation is provided for the amount of abrasive removed at each truing, and the wheel drive motors are arranged to vary their speed to provide a constant peripheral grinding wheel speed as the wheel wears down to discarding size.



Sketch of the air gaging equipment which controls the size of the work during the grinding operation.

Each pair of workheads is driven by a common drive shaft of tubular construction, so that the drive is from the center, equidistant from both heads, thus eliminating torsional errors in the crankshaft which would be the result of unequal movement.

This machine occupies a floor space of 21½ feet in width, 45 feet in length, and 11 feet 4 inches in height, and will weigh complete approximately 140,000 pounds. The total horsepower of the motors on the machine is 139. The space required by the machine, by comparison of the square footage, is approximately equal to eight conventional



Overall view of automated transfer type crankpin grinder taken during construction. Operator is standing in front of central control station which controls all units of the machine. Controls at each station are used during setting up operations. Cranks are picked up from conveyor at left and transferred through each of the four grinding stations before being placed on another conveyor at the far end.

crankpin grinders. The production capacity of the machine is 45 to 60 crankshafts per hour, or equal to about 4½ to 6 conventional machines, each with its own operator, under operator-controlled production.

For grinding V-8 shafts with four pins, two base units, each mounting two grinding wheel slides, are required. A transfer unit is mounted over the four grinding stations. Cabinets for hydraulic and electric controls are located behind the machine for easy maintenance. Although the grinding units contain many time-proven features such as wheel spindle bearing construction, and automatic wheel guard mounted truing with automatic compensation for wheel wear, the transfer type crankpin grinder is a completely new machine.

Grinding wheel life is expected to be many times that of wheels used on conventional crankpin grinders because: (1) Automatic wheel truing at every work cycle, or at any pre-set number of cycles, eliminates the human element in truing which tends to remove too much of the wheel surface in the truing operation; (2) the rigid, cartridge type bearing which supports the grinding

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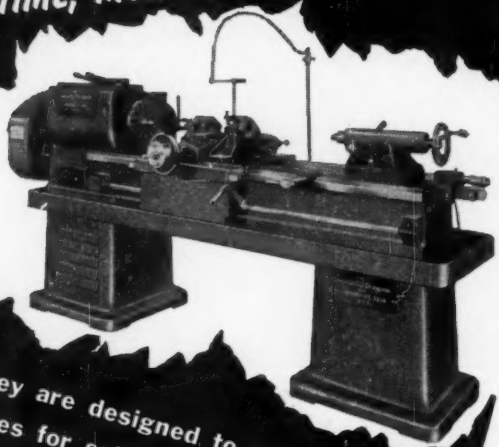
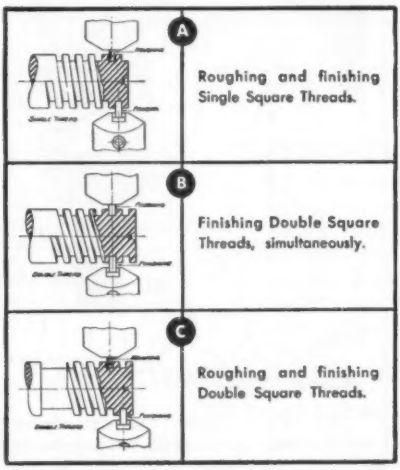


Because they are designed to permit over 25 alternatives for setting up the threading tool to meet specific applications.

For example:



THE "L1" is the most versatile of any threading Lathe, for the production of Square, Standard and 29° threads, internal or external . . . and it does it faster, better — AUTOMATICALLY!

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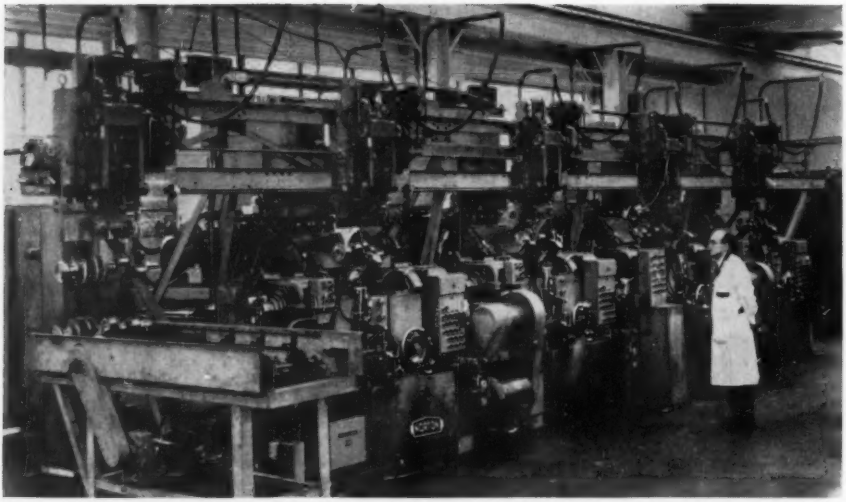

Closeup view of one of the four grinding stations. Size is controlled by the airsnap gage just below the crank which is being lowered by the transfer hook into the work heads. Crank is automatically located accurately both lengthwise and angularly by the work holders.

wheel spindle at each end is already increasing wheel life substantially in another new Norton machine, the Multi-Wheel grinder.

Air operated gages, which measure the pin diameter during grinding, control the in-feed of the grinding wheel.

The End

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DO NOT TEAR THE MATERIAL BEING CUT.
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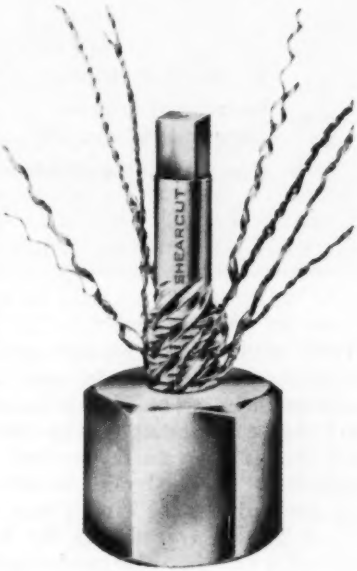
ARE PRECISION GROUND FROM SOLID AFTER HARDENING.
LOWER PRODUCTION COSTS.
PREVENT SCRAPPED PARTS.
LOWER TOOL AND LABOR COST PER THREADED HOLE.
REPLACE STANDARD TYPE TAPS.



SHEARCUTTING THREADS IN BLIND HOLE
NOTE THE CONTINUOUS ONE-PIECE CURLED CHIP BEING FED OUT OF THE HOLE →

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Time Study . . . part 6
Arbitrating Work Standards

By **Harold R. Nissley**
Professional Engineer
Cleveland Heights, Ohio

Cartoons by **Glueckstein**

THE WISE company will arbitrate work standards only under very favorable conditions: (1) That it has a 10 to 1 chance of winning (not just 50-50); (2) that it can gain the services of a technically qualified man to arbitrate its standards dispute (and a man who is, of course, acceptable to the union as well); (3) that it is psychologically and economically prepared to lose a good standards case.

Too many companies have learned through bitter experience that their standards cases did not look nearly as good in an arbitration court as they did when they agreed to arbitrate the standards. Companies (and unions) are by-passing other approaches to their standards problems—approaches which are less "loaded" than arbitration.

Alternatives to Arbitration[1]

There is, of course, the alternative of risking a strike arising from a standards dispute. Let us, however, consider the less costly methods of settling such disputes. (1) If you are so sure of your work standard but cannot get agreement with the union after several grievance meetings, why don't you offer to make all day time studies of the job(s) under dispute **in the presence of a union officer, steward, or union time study man?** (2) Take the position

[1]For a fuller treatment of the pros and cons of arbitration see the writer's articles in the American Management Association publication, PERSONNEL, "Winning Your Arbitration Case—Steps to be Taken" (November, 1952) and "Do You Really Want Freedom from Work Stoppages?" (July, 1947).

AVOID ARBITRATION COURTS. TRY . . .

- **joint time studies with the union**
- **outside professional opinion to counsel you**
- **the quasi-legal method of mediation**

that your own time study people might possibly be wrong; so call in outside professional help to check on their work and results. (3) Instead of risking your incentive system in an arbitration court (even though only one job may be at stake), take your case to **mediation.**

Joint Time Studies

The majority of time study disputes arise because the union does not understand or believe in the figures of the company time study observers. The company frequently shows the time study summary sheets; but it seldom shows the original time study observation sheets. However, when the original sheets are available for union scrutiny many points are left unexplained: Why did the analyst cast out high time values (instead of low ones)? Did the analyst allow for such noncyclical elements as sharpening tools occasionally, etc.? Were materials and machines ideal at the time of the observation?

Thus, regardless of how careful your time study man has done his job, if he does not come up with the union's figure, you may be headed for trouble. This may be another way of saying that your time study man may be a good analyst but a poor salesman. The point to remember is there must be a meeting of the minds—from the start to the finish. What better way can you effect such a meeting of the minds than by having critical time study disputes audited by some member of your union? Remember, if you can't sell a work standard, take another look at the standard.

Professional Opinion

Let us assume you have done all you can to settle your dispute—explained the details of your time studies and even gone the full length of 8 hour studies in the presence of a union steward or officer. You do all you can and the union is still unconvinced (and very unhappy). At this point it might be well to consider the possibility of calling in, on a limited basis, professional engineering help. Such help may sustain your belief in your standard and will be available to you should your case go to arbitration. But the

Joint time studies

It is far better to get such counsel privately

right kind of professional counsel will be as ready to tell you that you have a poor case as to encourage you in your position. And this candor is what you would prefer. Moreover, a good professional engineer, if he takes a dim view of your standards position, will suggest immediate and long-range remedies for your problem. It is far better to get such counsel privately in the way of a confidential report than to get it from an arbitrator who must submit his recommendations to both sides with extreme objectivity.

Mediation

Because mediation does not tie the hands of either party, many companies and unions have adopted this quasi-legal method of settling their disputes. The Federal Mediation and Conciliation Service has a staff of mediators who serve as go-betweens in labor-management disputes. These tax supported services cost little or nothing. But because most of the people in the service are not industrial engineers, some unions and companies prefer to pay the $100 to $200-a-day rate to technical arbitrators who are qualified to render equally good service in the mediation area. The names (and qualifications) of such free lance mediators may be obtained from the American Arbitration Association or the Federal Mediation and Conciliation Service; such arbitrators (and mediators) have been checked by both of these agencies particularly in matters of ethical conduct.

Thus a company may enjoy all of the benefits of arbitration, without risking a great deal, by mediating its work standards case. But because mediation does not bind either party to the final recommendations of the mediator, this whole process may have to be duplicated in case the loser is unwilling to abide by the recommendations of the mediator and insists upon economic pressure or going to arbitration (in the hope that another industrial engineer serving as arbitrator will see the case differently than did the mediator).

Arbitration

Because the writer has seen many weak cases brought to arbitration, he urges all who read these pages to consider the preceding alternatives to arbitration before taking a standards dispute to arbitration. Let us assume that all or most of the foregoing steps have been observed (and each step has sustained the company's position); the final step (short of economic pressure) is that of arbitration.

Arbitrators are selected in many ways. The most common way is that of asking for a list of approved arbitrators from either the American Arbitration Association or the Federal Medi-

ation and Conciliation Service. These two agencies will submit a list of 5 to 10 names with a short paragraph description of each arbitrator submitted. The final selection is made after each party has crossed out (black-balled) an equal number of names; the name left standing on a 5, 7, or 9 man list is the one who is called and invited to arbitrate the dispute. When the parties cannot find anyone suitable on the first list, a second list is requested. Occasionally the parties will agree upon someone who is so well accepted by both labor and management that the mere mention of his name by one side will be sufficient for joint selection of this person.

Increasingly labor-management contracts contain arbitration clauses in them—clauses which frequently spell out the kinds of problems that may be arbitrated, the manner in which the arbitrator for disputes will be selected, and the way in which the arbitrator's fees and expenses will be divided (usually equally between the parties).

If a case is worth taking to arbitration, it is worth spending some time and money on its preparation. If it is a technical case such as a work standards dispute, don't stop at hiring the best legal talent you can obtain; I have seen some big work standards cases go down to defeat after the most painstaking care of large corporate law firms —when the union injected their industrial engineering talent from headquarters. If you have a firm of consulting engineers, an arbitration case involving a work standard might be a good place to give such a firm their first real test by letting them handle the case for you from start to finish. If you don't have any such technical help during a pending arbitration, you would do well to provide yourself with this help because you can be pretty certain, if the case is big enough or involves the right personalities, the union will be there with the technical punch that could make you and a corps of smart lawyers very unhappy.

Conclusions About Taking Standards Cases to Arbitration

There are several solutions to a standards dispute: (1) Do a good selling job on your standard to begin with—by permitting union representatives to be present when all day studies are made and discussing the results (or even inviting outside union time study men in to appraise the jobs in collaboration with your own time study engineers); (2) Enlist the help of an outside professional engineer who may be better equipped, technically and sales-wise, than your own time study engineers; (3) Limit the

power of any one person to disrupt your wage or work standards pattern by putting your case before a free lance mediator or a government mediator; (4) Go the full gamut by appointing either a sole arbitrator or an arbitration board chaired by an impartial (outside) industrial engineer. All of these solutions have their advantages and limitations. All of them have certain calculated risks. Knowing just which one to use or how far to go with it must be decided by intelligent management—with or without professional help.

End of Part 6

Mediation

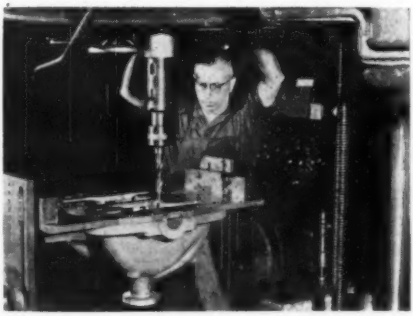
Although the Bureau of National Affairs has published hundreds of labor-management arbitration decisions in the last decade there are very few published cases involving work standards. Would you be interested in seeing a few such work standard cases appear in some future issue of the BLUE BOOK? If enough reader interest develops, Mr. Nissley will devote one or two articles to such cases. Let us know your wishes in this by writing the editor of the MACHINE and TOOL BLUE BOOK, 222 E. Willow St., Wheaton, Ill.

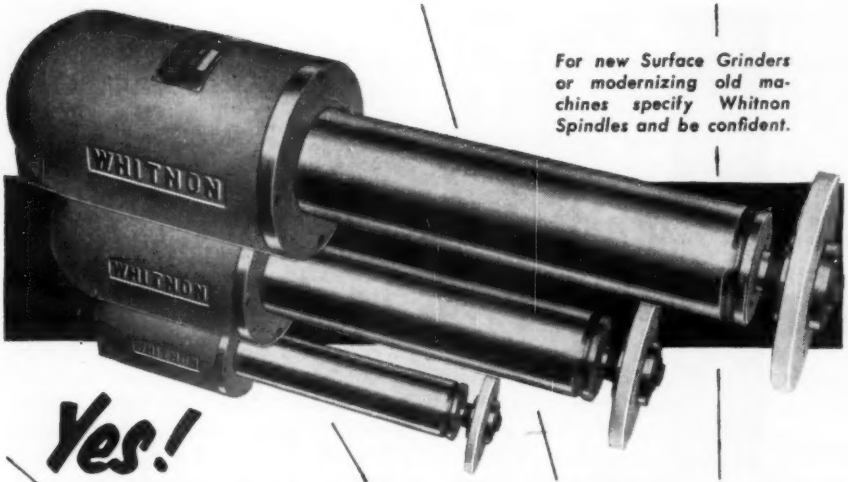
Home-made trunnion fixture simplifies radial drilling

A simple, home-made trunnion fixture for radial drills has cut set-up time, eased holding problems, and improved the accuracy of jobbing work at the De Laval Steam Turbine Co., Trenton, N.J.

Shown here is a pump cover mounted in the trunnion fixture and located on the face into which drilling is required. Work of this kind would be difficult to locate accurately in any other way.

The fixture, made in the De Laval machine shop, consists of a bed mounted on two A-frames that may be clamped at any point along the bed. An index plate, shaft-connected to a worm-gear drive, is mounted on one A-frame. Index holes at desired intervals are jig bored and bushed. A spring-actuated index pin locks the index plate. A side-plate attached to the index plate and a matching side-plate on the tailstock A-frame are adjustable for height.





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Helical Carbide Milling Cutters Triple Cutting Speeds on 4140 Steel

CUTTING speeds have been tripled under proper machine conditions, with use of helical carbide milling cutters on milling machines at the Torrance, Calif., plant of The National Supply Company. Most impressive, however, are related factors.

Chips are expelled freely by these cutters. They never cling to the cutting teeth to be revolved back into the cut. This eliminates many tool breakdowns.

Machine vibration was less than for the slabbing cuts on hardened 4140 steel using other types of carbide cutters.

The helical carbide milling cutters combine the hardness of carbide with the efficiency of a true helix flute design. The cutter gives the impression of frailty and differs radically from the design of conventional hyper milling cutters. The proportioned dimensions of the carbide inserts do not even conform to the usual carbide practice and apparently the fit for the braze where it is applied between the contour of the milled seat and the corresponding

- **The Job:** rough mill ends to produce tongues 3½" thick by 4⅞" long in 4140 steel forgings, 270 Brinell hardness.
- **Machine:** Kearney & Trecker 15 hp vertical miller.
- **Stock Removal:** 2.1 lb. per min. Maximum was 3.7 lb. per min or 13.1 cu. in.
- **Cutting Time:** Reduced from 145 min. to 49 min.
- **Tool:** New helical carbide cutter.

twisted surface of the carbide tip does not have to be close.

The cutters used in tests and production work are helical end mills 3 in. in diameter with six blades 3 in. long. The helix angle is 15 deg. Shanks are 2 in. in diameter. These cutters are manufactured by Sonnet Tool and Manufacturing Company (division of Sonnet Supply Co.) under the name of Helicarb.

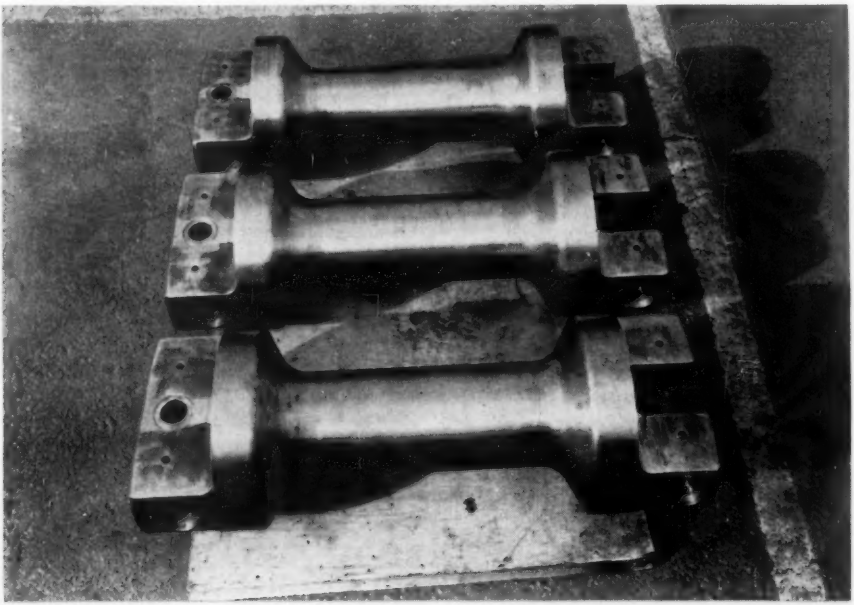
Drive shafts for steel mills provided the first production test for the Helicarb cutters. These shafts are 4140 steel forgings quenched and drawn to 270 Brinell hardness. The turned 10-in. diameter ends were rough milled to produce tongues 3½ in. thick by 4⅝ in. long. The operation was done on a Kearney & Trecker 15-hp vertical milling machine.

The average rate of stock removal was 2.1 lb. per minute for a total of 105 lb. removed. The maximum rate was 3.7 lb. per minute or 13.1 cu. in. per minute. Cutting time per part was reduced from 145 minutes by the best previous method to 49 minutes, reducing job time to 60% of former requirements. If maximum rate of stock removal were maintained the total stock removed in an hour would be 222 pounds.

Spindle speed was 400 rpm; cutting speed, 314 sfm; feed 10.5 imp; chip load was 0.0044 inch per blade.

Before making production runs with the Helicarb milling cutter four test

1. In milling the tongues on the ends of these steel mill drive shafts 105 lb. of 4140 steel of 270 Brinell hardness were removed in 49 minutes by a helical carbide milling cutter. Former cutting time was 145 minutes.



runs were made on Type 4140 steel blanks at 270 Brinell hardness, quenched and drawn. Both slab and end milling were performed on the test block, using a 5H Milwaukee plain milling machine of 15 hp. The carbide cutting edges were of Adamas grade "D". A No. 50 integral shank and cutter was mounted direct to the spindle of the machine.

Test data and results are shown in the accompanying table. The clearing of chips without any appreciable recutting when the cutter was buried 1½ in. deep and removing a ¾ in. wide chip during the second test on end milling was remarkable. This test was stopped after 12½ inches of cutting by motor failure from overload.

The clearing of chips is attributed primarily to the high axial helix angle. The cutter tooth makes its stroke through the workpiece and out of the cut progressively, like lawn-mower blades over the cutter bar. The chip is not fully cut and freed until the tooth has finished its scissors-like cutting contact with the parent metal. Consequently, even though the cut portion of the chip may tend to cling to the tooth and ride on it as it rotates away, it is held to the parent metal until the cut has progressed to the finishing end of the tooth. A combination of cutter rotation and delayed final release from the cut compels the chip to peel itself free from the face of the cutter blade.

Another novel feature of the cutter is its constant positive radial rake resulting in a smooth, free cut and in reducing the power required by the cutter. Positive rake is believed to make the chip curl tightly, thus giving it more structural strength to tear it-

TEST DATA AND RESULTS

Test No.	1	2	3	4
Type of Cut	Slab	Slab	End Milling	End Milling
Spindle Speed, RPM	400	400	400	400
Cutting Speed, RPM	314	314	314	314
Feed, IPM	10.50	12.50	8.75	10.50
Chip Load, Inch/Blade	.0044	.0052	.0036	.0044
Depth of cut, Inch	.500	.500	.750	.750
Width of cut, Inch	2.000	2.000	3.000	3.000
Rate of Metal Removal Cu. In./Min.	10.5	12.5	19.7	23.6
Rate of Metal Removal Lbs./Min.	3.0	3.5	5.6	6.7
Rate of Metal Removal Lbs./Hr.	180	210	336	402
Length of cut, Inch	16	16	16	12½
Surface Finish—Micro-In., RMS Produced by Side of Cutter	40	40	50	50
Surface Finish—Micro-In., RMS Produced by End of Cutter	90	90	45	75

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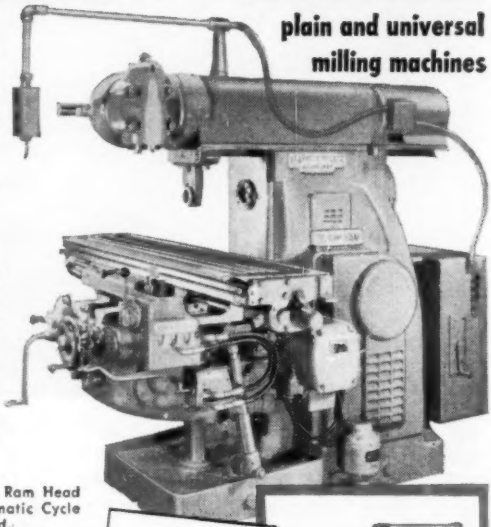
Kearney & Trecker's *NEW* RAM HEAD

plain and universal milling machines

KEARNEY & TRECKER'S new line of Ram Head milling machines combines a conventional horizontal spindle and a self-contained motorized sliding ram. As a result, horizontal and vertical spindles can be run separately and simultaneously.

The Ram Head machines are available with a choice of three heads — Universal, Vertical and Quill types which can be rotated through 360°. You can perform vertical, horizontal and angular milling on one machine *in a single setup*. They are built in model CH, CK and CSM designs with 69 different machines in sizes from No. 2 to No. 4 in both plain and universal styles. Machines may be equipped with either Standard Directional Table Control, or Mono-Lever and Automatic Cycle Table Control.

For the full story, contact your nearest Kearney & Trecker representative, or write Kearney & Trecker Corp., 6784 West National Ave., Milwaukee 14, Wisconsin.



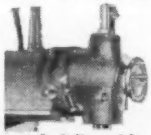
20/10 hp No. 3 Model CSM, Plain, Ram Head machine with Mono-Lever and Automatic Cycle Table Control, Type U Universal Head.

available for TOOL-LEASE

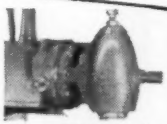
with choice of three types of heads

(Eight spindle speeds in three optional ranges)

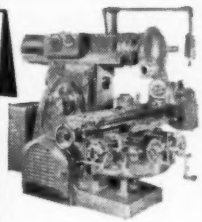
Type U Universal Swivel Head has two graduated bases at right angles to each other, both can be swiveled thru 360°



Type Q Adjustable Quill Swivel Head has 3½" movement... micrometer stop and dial indicator. Spindle can be set at any angle through 360°



Type V Vertical Swivel Head adapted for vertical and angular milling. Spindle base is graduated . . . can be set thru 360°.



7½ hp No. 3 Model CH, Universal style Ram Head milling machine with Standard Directional Table Control and Type U Universal Head.

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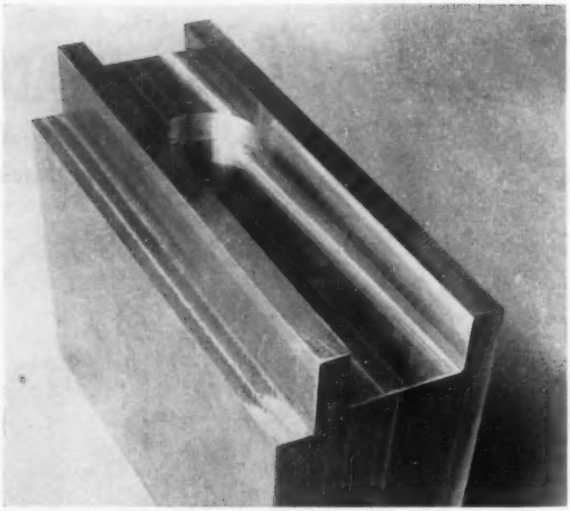
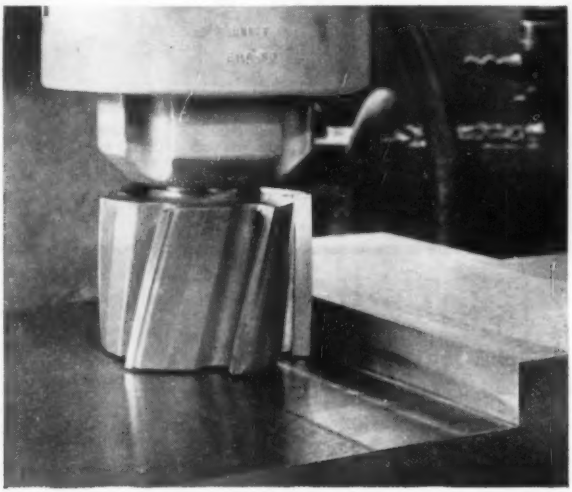


2. Tests of a helical carbide milling cutter on this block of 4140 steel hardened to 270 Brinell were most remarkable during the second end-milling cut when chips cleared without any appreciable recutting. The 3-in. diameter cutter was buried 1½ in. deep while removing a ¾-in. wide chip. Two 16-in. long slab cuts, 2-in. wide and ½-in. deep, are shown also.

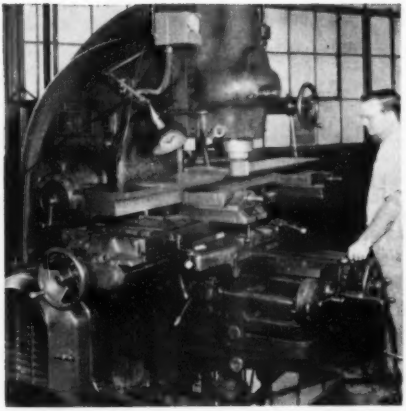
self loose from the face of the cutter tooth.

Tool breakage is overcome largely by a close, in-the-spindle mounting. The minimum of jarring that results when cutting action moves progressively across the tooth is also a factor in the advantages gained in using the new type cutter.

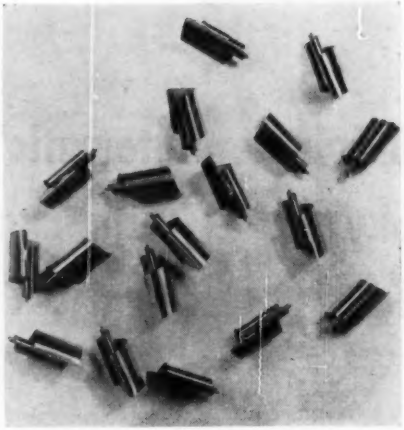
The greatest field of application for these cutters appears to be for steels, particularly those that are heat-treated to tensile strengths of more than 200,000 lb. per sq. in. Limiting factors are



3. A 4-in. helical carbide milling cutter was used to mill a "rack."



4. Milling a "rack" with a 4-in. helical carbide milling cutter on a Kearney & Trecker vertical milling machine.



5. Chips removed by milling cuts on the test block were curled tightly, thus giving them more structural strength to tear loose from the cutter tooth.

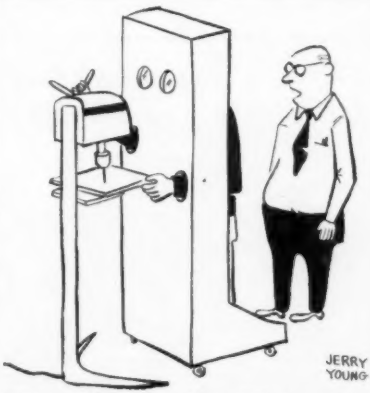
bearing capacity, speeds, and available power. As machines having 25 hp to 50 hp with higher speeds and better outboard bearings become available, applications in this field should become increasingly practical. Finishes of 30 rms and better have been reported on high alloy steels with tensile strength approximating 200,000 lb. per sq. in.

As much as 180 cu. in. per minute of 75 ST aluminum have been removed on a 10-hp K. & T. mill. In tests on non-ferrous materials, removal of 6 to 8 cu. in. per minute per horsepower has been recorded.

The helix angle for these materials and soft steels is 50% to 100% greater than for hardened steels. The rake angle for steels is zero. Clearance angles and lands vary with the properties of the materials to be cut, whether steel or non-ferrous material.

To assure free operation with maximum rigidity, needle bearings are advised for overarm supports. Rigidity should be a major consideration in the design of all fixtures and set-ups. If this is done tool life between resharpenings will be two to three times greater than for straight angle carbide cutters. The reason is believed to be the constant chip load and uniform cutting angle of helical carbide tools.

The End



"We encourage safety, Robertson, but it should be tempered with common sense."

8-Spindle Automatic's Output Skyrockets with Expendable Tooling Tool Cost Down . . . Production Up

PRODUCTION of SAE 1020 forged steel liner rings has been increased from 200 to 800 pieces per shift with tungsten carbide tooling. Both sides of the workpiece are machined by double indexing 60 horsepower eight-spindle New Britain Automatics and reversing the part in the chuck. Operations are: multiple turning both outside and inside diameters, and facing and chamfering.

- **Machine:** 8-spindle automatic
- **Production:** From 200 to 800
- **Tool Cost:** Down 59 percent
- **Tooling:** Expendable carbide

Feed is 0.006 i.p.m.; speed is 535 r.p.m. at 570 maximum s.f.m. Depth of cut varies between ⅛ to ⅜-inch on roughing and 0.030 to 0.050-inch on finishing. Heretofore these operations were per-

COMPARATIVE COST ESTIMATE DATA

PREVIOUS CARBIDE TOOLING

	Rough Turn O.D.	Finish Turn O.D.
Tool Cost	$25.00	$3.00
Regrind Cost	5 at $2.00 each	4 at $0.50 each
Total Tool Cost	$35.00	$5.00
Average Pieces per Tool	1500	1200
Tool Cost per Piece	$0.023	$0.004

Total Tool Cost per Piece $0.027 or $2.70 per 100 Produced

"EXPENDABLE" TOOLING

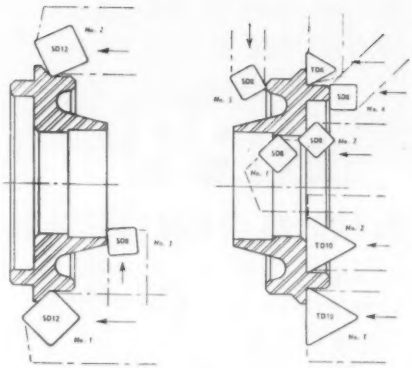
	Rough Turn O.D.	Finish Turn O.D.
Cost of Holder	$35.00	$16.00
Prorated Over 100 Inserts	$0.35	$0.16
Cost of Insert	$4.84	$2.00 (grind only)
Total Tool Cost	$5.22	$2.16
Average Pieces per Tool	600	1000
Tool Cost per Piece	$0.009	$0.002

Total Tool Cost per Piece $0.011 or $1.10 per 100 Produced

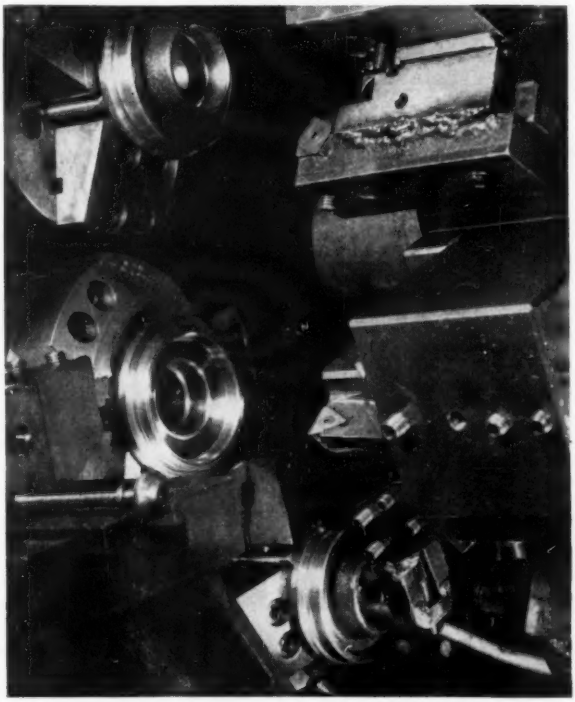
formed with standard tipped carbide tooling which required excessive downtime for tool changes.

Typical example of the reduction in tool cost obtained on this job is shown in the comparative cost estimate, which shows a tool cost reduction for both rough and finish turning the part's outside diameter of 59 per cent. Tools performing other operations effected similar savings.

With standard square and triangular inserts of grade K3H Kennametal, a new cutting point is obtained by loosening the socket-head screw and rotating the tip to a new cutting edge. By interchanging inserts of the same size even greater economies are effected. For example, holder No. 1 for an SD-12 in-



Inserts are indexed or rotated to a new cutting edge in seconds without disturbing the tool setup to provide three to four cutting edges per insert.



Production of SAE 1020 forged steel liner rings was increased from 200 to 800 pieces per shift while tool cost was reduced approximately 59 percent by using insert carbide tooling.

HIGHER SPEEDS!
FASTER GRINDING!

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AIR GRINDERS

MODEL JA
50,000 R.P.M.
$42.00
IN U.S.A.

Weight 12 ounces; length 6¾ inches; chuck size ⅛ inch. Wheel guard removed for better illustration.

The RPM's stay up while grinding . . . not only when the grinder runs idle. That means better work—longer wheel life.

High speed grinding with small wheels was a Madison-Kipp development of the late twenties. It was born out of a pressing need in our tool room. Because tool room grinding problems are universal, we believe it will pay you to utilize Kipp grinders in your tool room as generally as we do in our own.

kipp

MADISON-KIPP CORP.
207 Waubesa St., Madison 10, Wis., U.S.A.

sert has a 6-degree side rake. When its four cutting edges have been expended, the normal 12-degree side relief is decreased by grinding it to 6 degrees, then the insert is used in holder No. 2 with no side rake for finish turning. Likewise, after all cutting edges on the TD-10 insert in holder No. 1 have been utilized, it is interchanged with a TD-10 insert in holder No. 2 and opposite corners used. Extended life is similarly obtained by switching their SD-8 inserts.

The End

Don't miss the interview with Arthur F. Vinson, Vice President, Manufacturing, General Electric Company. This issue.

Why CIMCOOL scores with operators

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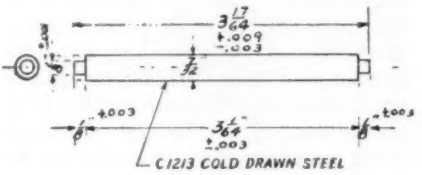
- *hand feeding completely eliminated*
- *feed fingers neither too tight nor too loose*

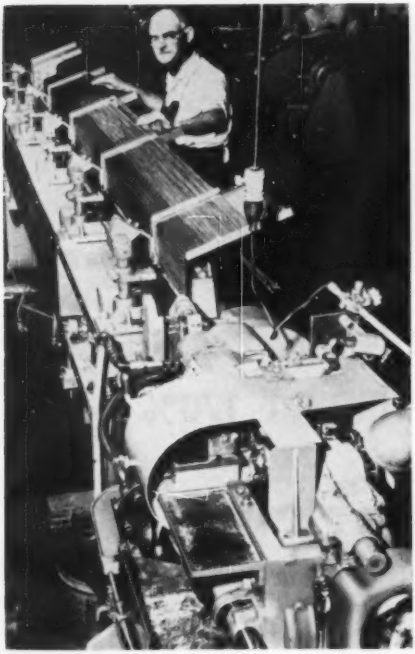
TO increase production of voting machine door-hinge rods, methods engineers at Automatic Voting Machine Company, Jamestown, New York, discarded the use of manual feed fingers in favor of an automatic magazine loading pneumatic bar feed.

The rods were formed and cut on a No. 00 Brown & Sharpe automatic screw machine to 3-17/64-inch lengths, which had to be held to plus .009, minus .003-inch allowances. C1213 steel rods, 7/32-inch OD and in lengths of either 10 or 12 feet, were fed manually through feed fingers to the spindle and collet of the automatic screw machine.

The engineers first cut the cycle time of the automatic screw machine to 4½ seconds by devising a cutting tool that formed two shoulder trunnions simultaneously at each end of the piece, while the piece was supported at one end by the turret stop.

Besides scratching stock, feed fingers were either too tight or too loose. When loose, the bore of the feed finger would not hold the pins to proper length. When tight, they marred the surface of





the stock. The rate at which feed fingers were replaced, as a result, was high.

End ejected automatically

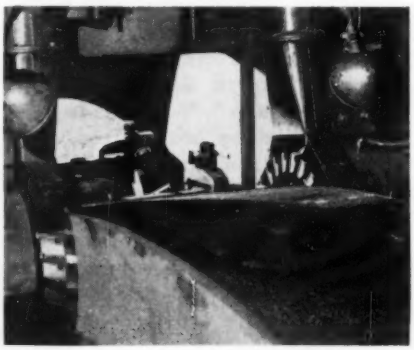
To overcome these disadvantages, the same automatic screw machine was equipped with a Model 43 Lipe-Rollway AML bar feed. This particular bar feed is actuated by air valves and cylinders. Approximately one-hundred steel rods are racked in a magazine along one side of a split stock bar tube, the lower half of which slides backward to receive the bottom rod in the magazine. A stock pusher, inside this tube, moves the bar into the spindle and collet of the automatic screw machine. After the rod has been almost entirely fed through the automatic screw machine, its end remnant is ejected automatically by a new rod.

The exact sequence of the feed cycle after the rod in the machine collet has been machined up to the end remnant is as follows: the machine clutch disengages, stopping the tool cycle but allowing the spindle to revolve, the collet to remain open, and the bar feed stock pusher to retract. The bar feed cam actuates an air valve which automatically trips the bar feed magazine, so that only one rod at a time drops into the lower, open half of the stock bar tube. The stock pusher then feeds the new rod through the automatic screw machine and ejects the end remnant. Positioned for the first cut-off operation the new rod—actually the stock rod pusher—engages the automatic screw machine clutch, the collet grips the stock rod, and the machine again is in full cycle operation.

After the changeover from manual to pneumatically-activated, mechanical stocking of steel rods, production increased 170%.

Carbide milling of giant tunnel segments produces up to 180 pieces per grind

Heavy-duty straddle milling of 7 foot Lincoln Tunnel segments with home-made 20-inch "catheads" and other spe-

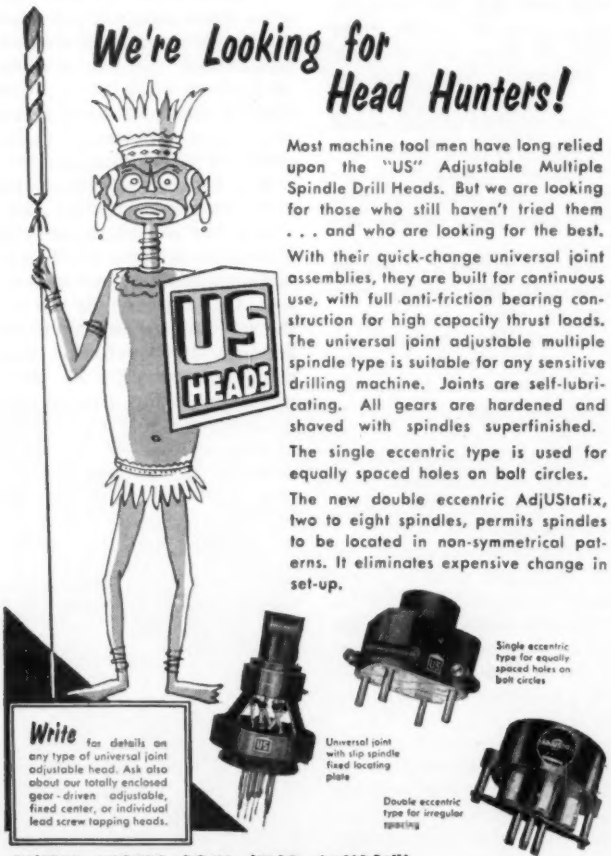


cial heavy-duty milling cutters employing Wessonmetal carbides is being performed successfully on 28-year old duplex milling machines at a large eastern foundry and machine shop.

The 7 foot segments are 32 inches wide, 14 inches deep and weigh close to a ton each. Earmarked for the third tube of the Lincoln Tunnel, approximately 28,000 cast iron segments are needed. In addition, over 1800 steel segments will be used at points where the tunnel enters rock to withstand bending stresses.

While the segments are still "hot" from the foundry, they are stored on open ground. Large sand inclusions are imbedded into surfaces requiring machining.

Because of the sand inclusions, coupled with the age of the machines, initial machining was attempted with high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speed steel. However, these tools "burned up" before completing one segment.

An attempt was then made to mill with carbide. The several grades and types applied at the outset resulted in broken blades and, in many cases, excessively worn tips.

Machining with Wessonmetal Grade "M" on the steel segments and Grade "GS" on the cast iron segments was recommended by Gerald Transue, Wesson field engineer. As evidence of the success of these carbides, the company now is producing from 100 to 180 pieces per grind. Both of these Wessonmetal grades have inherently high wear resistance.

Because a large number of high speed steel milling cutter blades had been obtained for the operation, they were salvaged by annealing and milling pockets into which the Wessonmetal carbide tips were brazed.

Two segments are milled per set up averaging 35 minutes. This includes cutter changes, set up, etc.

Operating the milling machines at maximum speed of 110 sfm, feed on the steel segments is 6 ipm and 14 ipm on the cast iron segments. Average depth of cut ranges from ⅜" to ½".

However, depth of cut on both the cast iron and steel segments has often exceeded ⅞ inches, beyond the length of carbide necessitating two cuts.

Employing high speed steel angles, the 20" "catheads" equipped with 15 Style BR Wesson lathe tools held in place by two set screws are parallel with the spindle axis. The nose of the tools are ground down to a 7 degree negative back rake and a 7 degree negative land about ⅛" wide.

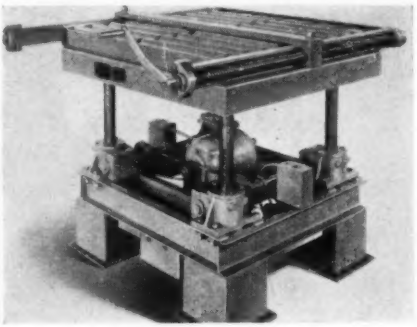
On the special heavy-duty milling cutters designed for high speed steel inserted blades now employing carbide tipped blades, a 6 degree to 8 degree positive radial rake and zero axial rake are producing up to 100 segments per grind.

Rubber molds are positioned mechanically

One of the largest U. S. processors of rubber products in Venezuela has had The Hamilton Tool Company of Hamilton, Ohio, design a special Portelvator for their plant there. This stationary lift was engineered to facilitate the placing of heavy molds into a two level rubber forming press.

The molds are moved from the 41" x 44" roller top table by means of a bar extending across the table and operated by a hand crank which motivates two screws, one on each side of the table top, causing the bar to move the mold easily from the table to the press cavity. Mold is removed from press by means of a chain attachment to bar, and reversal of screw rotation.

A 3 hp motor with reversing magnetic starter activates the table top which has a load capacity of 1700 lbs. The motor is operated by a push button station containing two sets of push buttons. One set controls the movement of the table top (up or down) for its entire distance of travel. The second set of push buttons controls the movement of the table top (up or down) to the intermediate level only. This double set of push buttons makes two levels of lift available to the operator with push button ease, and with no time-wasting guesses by the operator. Lift is from 30" to 50" above floor level at a speed



of 40" per minute. Each movement of the table top (up or down) is limited automatically by a gear limit switch.

The utilization of an arrangement of worm, worm gear and screw for power transmission at all four corners of support assures an even, level lift and eliminates any possibility of slipping, settling or tipping.

Transfer machine drills, reams, taps holes on centers of 6-face frame

Zagar Tool, Inc. has designed and built a pallet-type transfer machine to drill, ream, and tap varying size holes at varying angles in typewriter frames. The "track" is approximately 100 feet in length and occupies approximately 25 feet by 25 feet square. The frames are processed from the raw casting through the washing and cleaning operation.

The machine has a total of 224 spindles and accommodates 26 pallets when fully loaded. Each pallet delivers two completed frames every 30 seconds. Eight double stations perform 16 different operations. The machine cycle is as follows:

The pallets are loaded manually on a roller conveyor which feeds them to a pick-up station. The pallets are then turned 90° and fed into the first machine for drilling, reaming, and tapping.

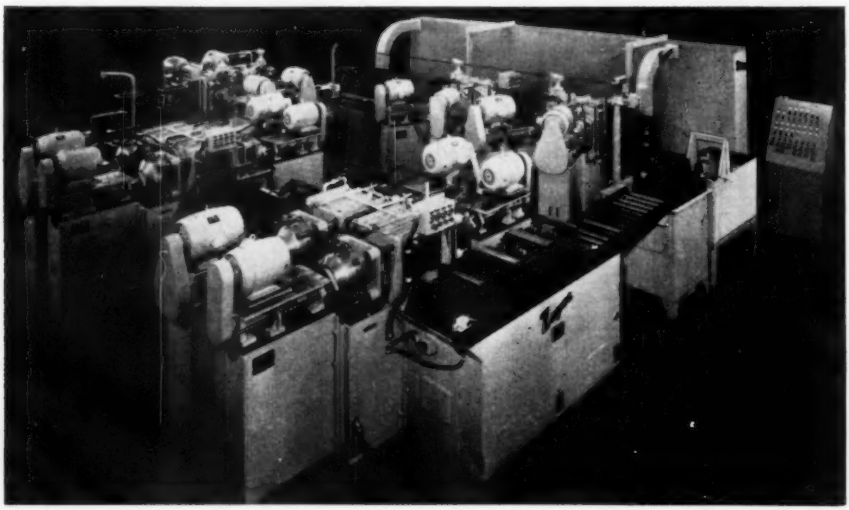
Machine No. 1:

2 Drill Work Heads—17 holes—No. 11 to No. 42 drill.
Approximately ⅝" closest centers.
One each .2525-.2656 and .113-.1399 step drills.
Two .2536 carbide reamers.
2 Tap Work Heads—14 Holes—No. 6-40, No. 8-32, and No. 10-32 taps.
Approximately ⅝" closest centers.

The pallet then moves onto a turntable which rotates it 90° for drilling and reaming on the second machine.

Machine No. 2:

2 Drill Work Heads—15 Holes—No. 42 to ¼" dia. drills.
Approximately 7/16" closest centers.
2 Tap Work Heads—13 holes—No.



6-40, No. 8-32, and No. 10-32 taps.

Approximately 7/16" closest centers.

Upon completion of work on Machine No. 2, the pallet moves to a roll-over station where it is placed on its side and positioned for the transfer bar.

Machine No. 3:

1 Drill Work Head—12 holes—No. 43 and No. 21 drills.

Approximately 13/16" closest centers.

1 Tap Work Head—8 holes—No. 10-32 taps.

Approximately 5/16" closest centers.

1 Drill Work Head—18 Holes—No. 33 and No. 29 drills.

Approximately 7/16" closest centers.

1 Tap Work Head—18 holes—No. 8-32 and No. 6-40 taps.

Approximately 7/16" closest centers.

With the pallet still on its side, it is turned 90° for drilling, reaming, and tapping the frame at the fourth station.

Machine No. 4:

2 Drill Work Heads—9 holes—3.1 mm. to No. 21 drills.

Approximately ⅝" closest centers.

2 Tap Work Heads—8 holes—No. 8-32 and No. 10-32 taps.

Approximately ⅝" closest centers.

After completion of all machining operations, the pallet is returned to its original position and then transferred to the "wash" station, where it is submerged 18 times in a solution for a complete cleaning before unloading.

The machine is electrically powered and hydraulically operated. Safety features are manifold. A cord extending the perimeter of the machine at eye level can be pulled for immediate stoppage of the whole machine.

Each station is equipped with a small control panel so that it can be operated independently for set-up and repairs. A large control console near the operators indicates, with flashing lights, the status of every operation in the machine.

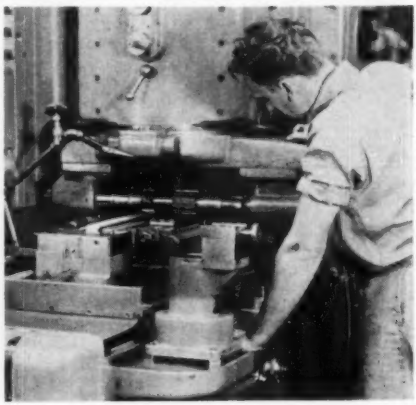
The entire machine is completely integrated so that no operation or movement will occur until each and every station has completed its job and is ready to accept more work. So complete are the safeguards that in the very beginning the machine will not move until the lubrication pressure reaches a predetermined level.

Rack shaving set-up finishes main drive shaft splines in 2 minutes

Confronted with a job that called for production of a spline with alternating thick and thin steps on the longitudinal faces of the teeth on the main drive shaft for a 6 x 6 truck, a leading automotive supplier found the answer to its problem in a set-up using a rack shaver with special tooling. The purpose of the thick and thin sections in the 17-tooth spline is to help the mating gears stay in mesh despite the angular thrust of a helical gear.

Two factors had to be considered in selecting the type of equipment that would be used to do the job. First, all the shaved portions had to be squared off at the corners and go the full depth of the teeth. Second, the time required to do the job had to be held to a minimum in order to keep costs in line.

On both counts the rack shaver built by Michigan Tool Company, 7171 E.



McNichols Road, Detroit 12, Michigan, proved to be the answer. Other shaving methods, if employed on this job, would take as long as 30 minutes.

Shafts being shaved are either SAE 8620 or 4620 steel. From 8 to 12 thousandths of stock is removed on a side. Involute spline teeth are hobbed with a relief at the root, enabling stock that is being removed in shaving to break free without danger of chips loading up

at bottom of tooth and damaging the blades.

To machine the involute spline on the main drive shaft, the shaft is assembled together with a master gear as shown

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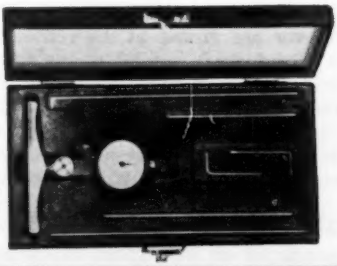

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in Fig. 2. The sleeve of the master gear slips over the threaded end of the main drive shaft. A nut placed over the threaded end holds the sleeve securely in place.

Since the relationship of the master gear to the spline being shaved is of considerable importance during the machining operation, a loading fixture is provided. The shaft and master gear assembly are placed into the loading fixture loosely assembled and the teeth of the spline to be shaved fit into mating locating teeth in the fixture. The master gear is precisely located in relation to the spline by means of the ground hole shown in Fig. 2. A locating pin slides into this hole and the two components are aligned for machining. The clamping nut is then tightened down, and the assembly placed between centers for machining.

Several passes are needed to remove the 8 to 12 thousandths of metal. The master rack is longer than the shaving rack. As work progresses through the shaving cycle the master rack is offset relative to the shaving rack resulting in a progressive removal of metal.

Control of the amount of metal removed is automatic being a function of the hydraulic circuit at the back of the machine. About 0.0015 to 0.002-inch of metal is removed in the first pass with about 0.0005-inch removed in the final pass.

Cutters used in Michigan Tool's rack shaver are visible at the center of Fig. 2. Production is 6000 pieces per grind and the sharpening operation requires only the removal of enough stock on the cutters to square up the tops. Blades are removed from the holder and sharpened on a standard surface grinder.

375 carburetor parts per hour produced on Mor-Speed machine

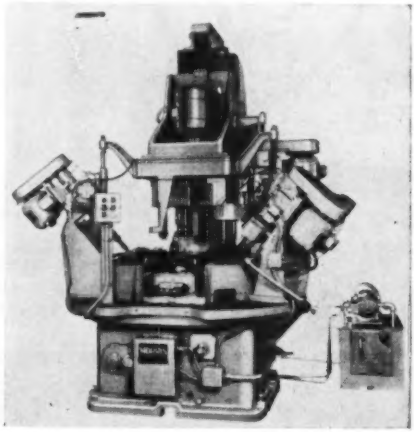
One of a series of machines built to machine four-barrel carburetor parts, a Mor-Speed production machine performs 25 operations on each carburetor body and completes 375 pieces per hour. Except for loading, transferring and unloading, operation of the machine is completely automatic.

Since the left and right sides of the carburetor body are identical, the transfer operation merely indexes the part 180°, presenting the other side of the part to the spindles.

The machine, manufactured by the Morris Machine Tool Co., Cincinnati, Ohio, has a 36" diameter indexing table which stops automatically at each of six stations. The tool spindles are carried in a master head with two 4-spindle clusters and on radially mounted drilling units around the outside of the table.

Station 1 is used for loading, transferring and unloading. At station 2, two multiple-diameter angular holes are drilled. At Station 3, two .0635" vertical holes are drilled. At Station 4, 1½" and 13/16" diameters are faced and a hole is reamed to .391". At Station 5, two vertical holes are taper reamed. At Station 6, two angular holes are tapped with a combination 7/16"-24 and ⅜"-24 tap. At the same station, four vertical holes are tapped ¼"-20.

Among the standard units used on the machine are: base, indexing table, rear



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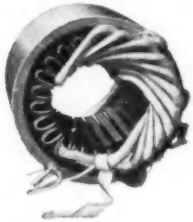

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column, straight and angular drilling heads, hydraulic and coolant systems. Among the special elements are: multiple spindle tap heads which use a single standard lead screw, to which the individual spindles are geared, and specially designed fixture which accurately locates the parts for machining.

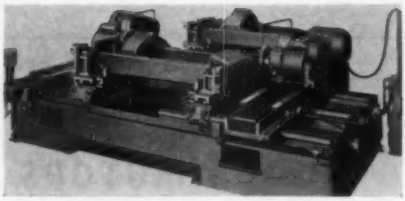
The load and transfer fixtures clamp with single hand-operated clamp. An automatic safety switch checks the clamping of the parts. Improper clamping prevents the table from indexing. Automatic lubrication is provided for all moving parts.

Duplex milling machine handles awkward parts

Motch & Merryweather has designed and built a new application of duplex milling for handling large, awkward parts. This design further expands their line of duplex milling machines featuring heavy duty, traveling milling heads instead of moving the table and fixtures.

The new machine, which mills both ends of tractor frames, will help to explain the method in detail. Two floor mounted, load-unload benches and duplicate sets of work holding fixtures are provided.

At one end of the machine bed, a traveling milling head is mounted on fixed ways. Opposed to the fixed ways, at the opposite end of the bed, is a saddle. The saddle is mounted on ways to provide adjustment of 6" to 11' for length of piece being milled. Ways on the saddle provide for mounting the second traveling milling head. The frame is located and securely clamped in individual fixtures for each end of the part. The frame itself is sufficiently rigid to provide for joining these two fixtures into one solid component unit. The clamping and locating of the frame in the fixtures are accomplished on a loading bench separate from the machine. The frame and fixtures are



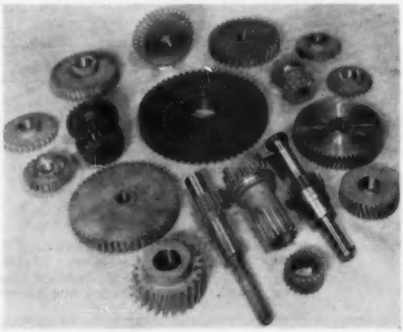
then placed on the machine, located by keys and secured by quick acting clamps.

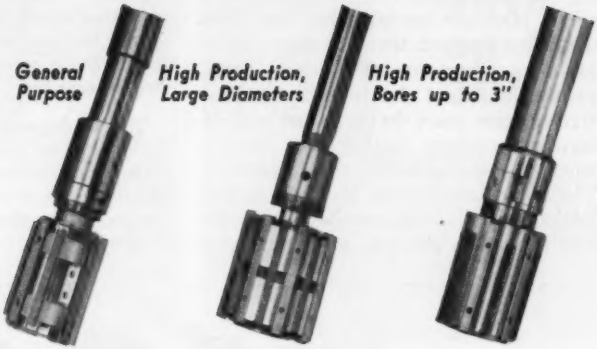
Duplicate fixtures make possible loading and unloading of one fixture while milling simultaneously on the other. Eliminated is the table moving past fixed milling heads. Even with duplicate fixtures and two load-unload benches, the space required for this operation is only slightly more than the area occupied by three tractor frames.

The right and left hand milling units are the Motch & Merryweather standard, heavy duty, Model M-30. The milling heads are individually motor driven by 30 HP, 1800 RPM motors. Non-metallic way liners are used as well as hardened and ground steel ways and automatic pressure lubrication. Heads are hydraulically operated by dual pumps from a single floor type sump.

Transmission gears produced on job-shop, short-run basis

Barnes Drill Company of Rockford,





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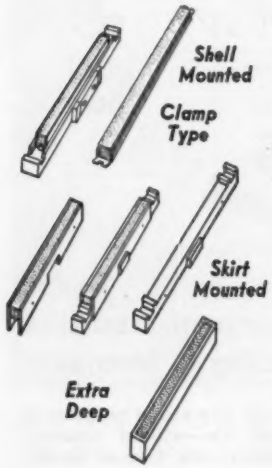

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Ill., has found that the installation of a single Michigan model 870-A gear finisher has enabled them to shave on a job-shop, short-run production basis, practically all of the spur and helical transmission gears that are used in their honing machines, drilling and tapping machines, and other special machines. The 870-A offers three methods of finishing gears—underpass shaving, modified underpass shaving, and transverse shaving. Adding to this is the crowning attachment for crown-shaving gear teeth. Barnes has found that it pays to finish their own gears to meet specified tolerances.

The underpass movement is utilized for shoulder cluster gears, while the transverse method in combination with the crowning attachment has proved effective in the shaving of wide face spur and helical gears. Barnes has found in

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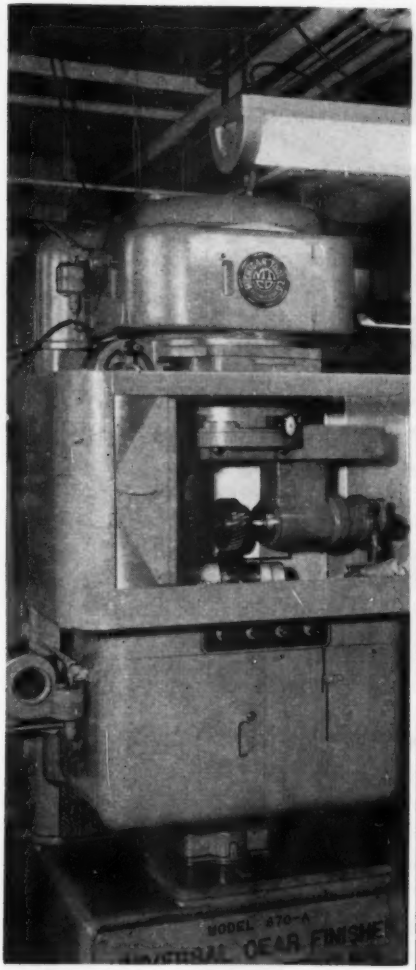
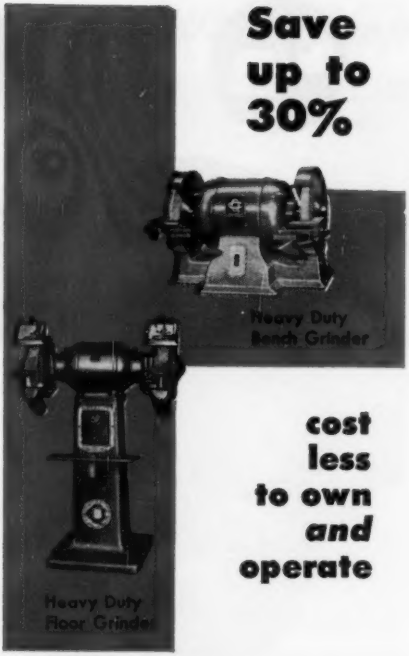


some cases that it is advantageous in their gear finishing program to employ range cutters. The 18-inch capacity of the model 870-A covers practically all of the requirements of the company and complete accuracy is maintained throughout whether parts are finished in quantities or one at a time.



Save up to 30%

cost less to own *and* operate

Queen City

grinders and buffers

So good they're guaranteed: "try one for 30 days . . . if you're not satisfied, return it." It makes cents . . . and dollars . . . to buy equipment like that at prices 20 to 30% under competing makes!

The complete range of Queen City Grinders and Buffers . . . floor and bench types . . . is described in newly-revised literature.

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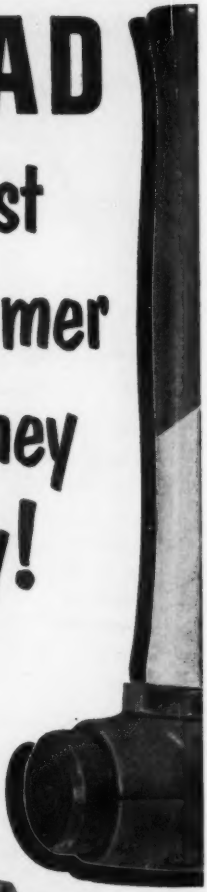
3912 Kellogg Avenue, Cincinnati 26, Ohio
"High Quality—Low Cost—For over 50 Years"

C/R JAW-HEAD

The best "soft" hammer your money can buy!



Tough, resilient water buffalo faces deliver plenty of power with full protection for delicate parts and finishes. Faces are easily replaced, and comfortable Safety-Flare handle gives you non-slip grip. Work goes better with a C/R RAWHIDE Jaw-Head. See for yourself.

- *Available from leading industrial suppliers. Also C/R Rawhide mallets and Rawhide mauls. For further information write Dept. 22*

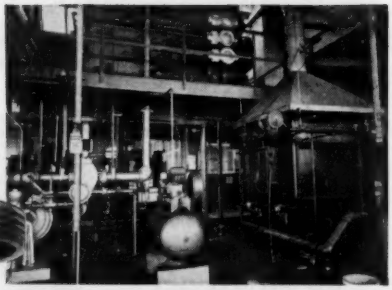
CHANGE FACES IN SECONDS

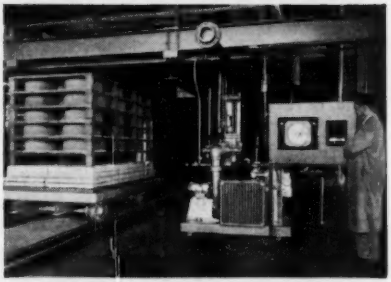
CHICAGO Rawhide MFG. CO.

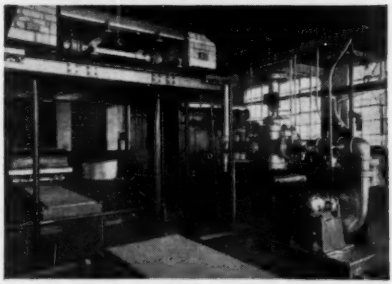
1301 Elston Ave. Chicago 22, Illinois

In Canada: Super Oil Seal Mfg. Co., Ltd., Hamilton, Ontario

From the NEW Blanchard Wheel Shop







VITRIFIED WHEELS

For more than 25 years, Blanchard has directed its efforts toward developing the best grinding wheels for Blanchard Surface Grinders. It began by pioneering with silicate bonded wheels, and then resin bonded wheels. Now, from a new, ultra modern Blanchard wheel shop come *vitrified wheels* ... scientifically batched, pressed and fired ... with positive control of time and temperature.

Today, Blanchard offers complete wheel service ... silicate, resin and vitrified!

Use Blanchard wheels on your Blanchard Surface Grinder. They do a better job in less time, with less trouble and cost ... whether your work is tough as copper or fragile as glass ... whether it requires heavy roughing cuts or clean-up cuts with flatness to .000005" and finish of 1 micro-inch.

for Better Blanchard Grinding

PUT IT ON THE BLANCHARD

THE BLANCHARD MACHINE CO.
64 STATE ST., CAMBRIDGE 39, MASS., U. S. A.

COUPON

Please send free copy of Blanchard Wheel Booklet and Wheel Holder Folder. BB

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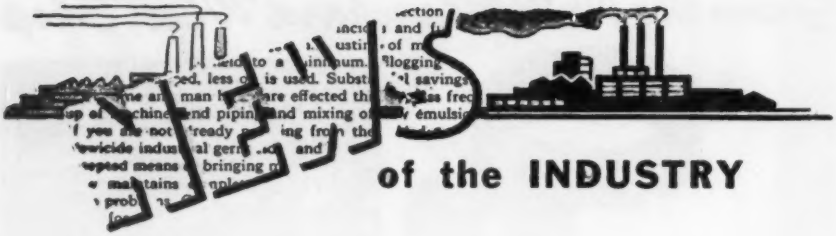


of the INDUSTRY

"In time of peace, prepare AGAINST war," says Tigges at annual N.M.T.B.A. meeting

Herbert L. Tigges, president of the National Machine Tool Builders' Association, and executive vice-president, Baker Bros., Inc., favors a modern version of the old proverb, "In time of peace, prepare for war." He believes the United States should adopt the policy, "In time of peace, prepare **against** war."

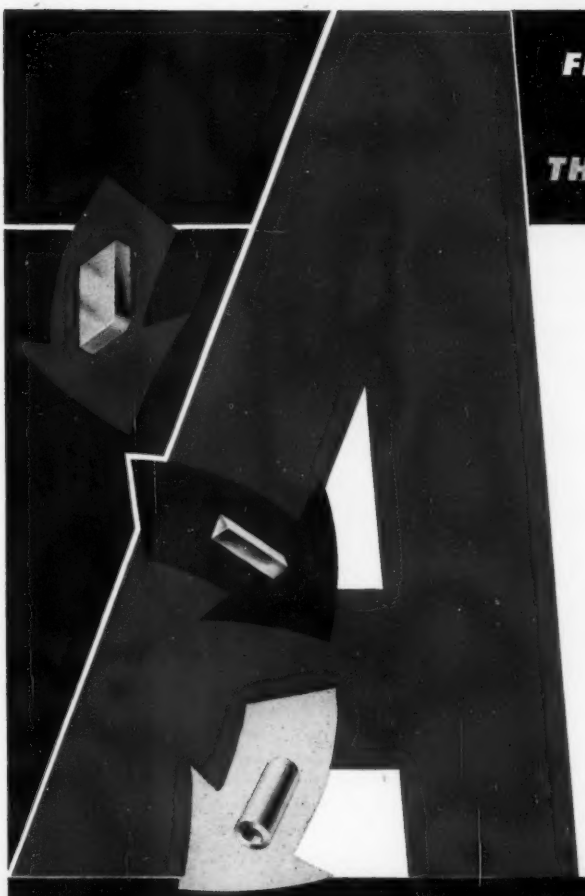
"We can prevent war, if we can make ourselves so strong that no one will venture to attack us," he told members of the National Machine Tool Builders' Association, at the annual meeting of that organization held this year at White Sulphur Springs, W. Va., Nov. 18, 19, 20.

"One major factor, looking toward tomorrow, overshadows all others," said Mr. Tigges, "a factor which we have never had to face before: What are we going to do if we are subjected to an attack by a foreign power right here at home, where we live?"

Mr. Tigges then went on to review the machine tool situation from that point of view. The machine tool reserve was the first subject touched upon, since he believes that "maintaining this reserve intact and unimpaired is our chief major consideration, and calls for the continuing vigilance of our Government Relations Committee."

Regarding the kind of orgnization there would be in Washington, should the United States be attacked by a foreign aggressor, Mr. Tigges said: "Never again will there be time enough to wait around and argue, and let months pass, until people in authority who do not understand machine tools and their functions are replaced by people who have practical knowledge of the situation. It doesn't take long for a bomb to drop. . . . A strong and virile machine tool industry—strong financially as well as ample in capacity—is a basic part of the nation's preparedness."

Considering the problem of foreign sales, and specifically, the question of the advisability of setting up affiliated companies in foreign countries, to manufacture under their low wage rates and thereby compete on price, which is impossible on an **export basis**, Mr. Tigges said, "From the standpoint of national defense, do we want to transfer American machine tool know-how and capacity to a part of the world which Russia might be able to overrun



FIRST WITH CARBIDE THAT LASTS!

More and more carbide engineers and designers are specifying ADAMAS for their tools, dies and wear parts because they know that Adamas Carbide grades are WORK-PROVED. High quality carbide from Adamas is JOB-ENGINEERED to fit both standard and special applications. Delivery is fastest in the industry.

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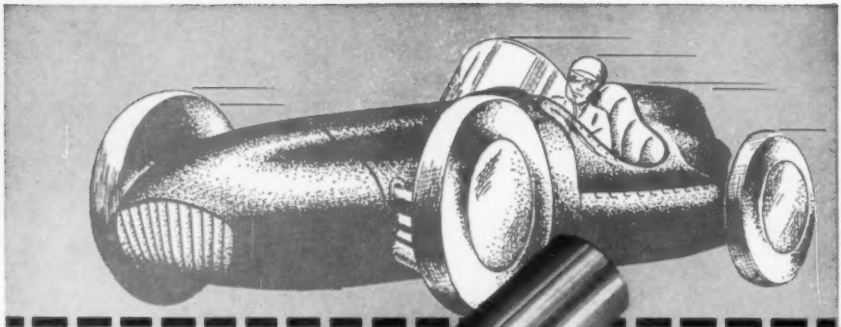

R and L TAP AND DIE HOLDER

WHEN SECONDS COUNT

The R and L TAP AND DIE HOLDER readily changes from right to left due to the patented instant release action. It can also be adapted to work on short threads, do bottom tapping, or die up to shoulders.

Releasing or non-releasing, (also furnished for acorn dies), this tool is made in a complete range of sizes from ⅜" diameter shank to 1½" diameter shank.

Fig. 1. Ready to start threading operation.

Fig. 2. Instantly engaged to full contact.

Fig. 3. Fully released. Note ample clearance between contact points of clutch.

RIGHT R and L LEFT TOOLS

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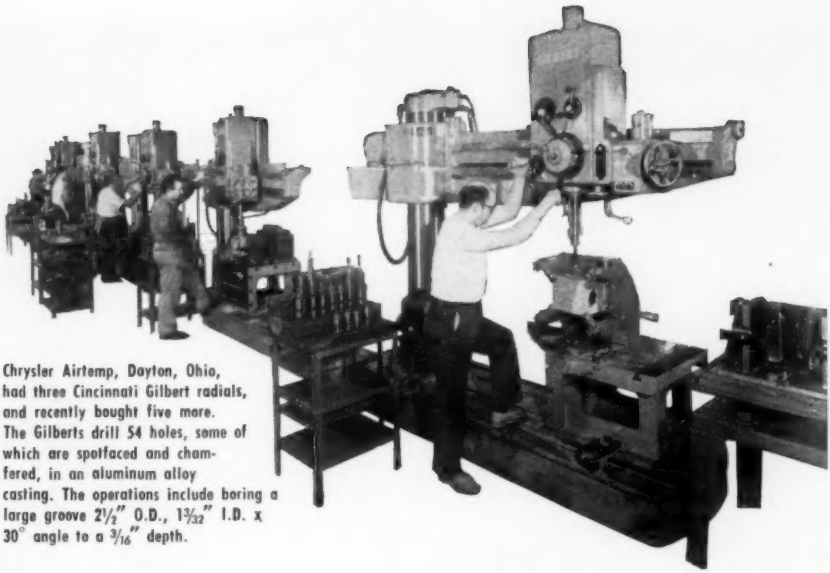
TURNING TOOL • CARBIDE OR ROLLER BACKRESTS • RELEASING OR NON-RELEASING TAP AND DIE HOLDERS, (ALSO AVAILABLE FOR ACORN DIES) • UNIVERSAL TOOL POST • TURRET BACKREST HOLDER • CUT-OFF BLADE HOLDER • RECESSING TOOL • REVOLVING CENTER RING • FLOATING BOLT HOLDER • KNURLING TOOL



Chrysler Airtemp, Dayton, Ohio, had three Cincinnati Gilbert radials, and recently bought five more. The Gilberts drill 54 holes, some of which are spotfaced and chamfered, in an aluminum alloy casting. The operations include boring a large groove 2½" O.D., 1$^{3}/_{32}$" I.D. x 30° angle to a $^{3}/_{16}$" depth.

They bought five more...

because Gilberts produce more. Ease of operation explains in part why Gilbert radials produce more in so many plants. For example, all speed and feed controls are on the head, within easy reach of the operator even when the arm is in its highest position. Direct reading speed and feed plates eliminate time-consuming calculations. You get instant finger-tip shifting of speed and feed levers. The four-lever feed turnstile puts one lever always within handy reach. Other easy-operating features: finger-tip clamping of the head to the arm; instantaneous one-lever arm control (unclamps, raises, or lowers the arm in one easy motion); effortless head traversing due to balanced, ball-bearing mounting; adjustable electric light at the spindle.

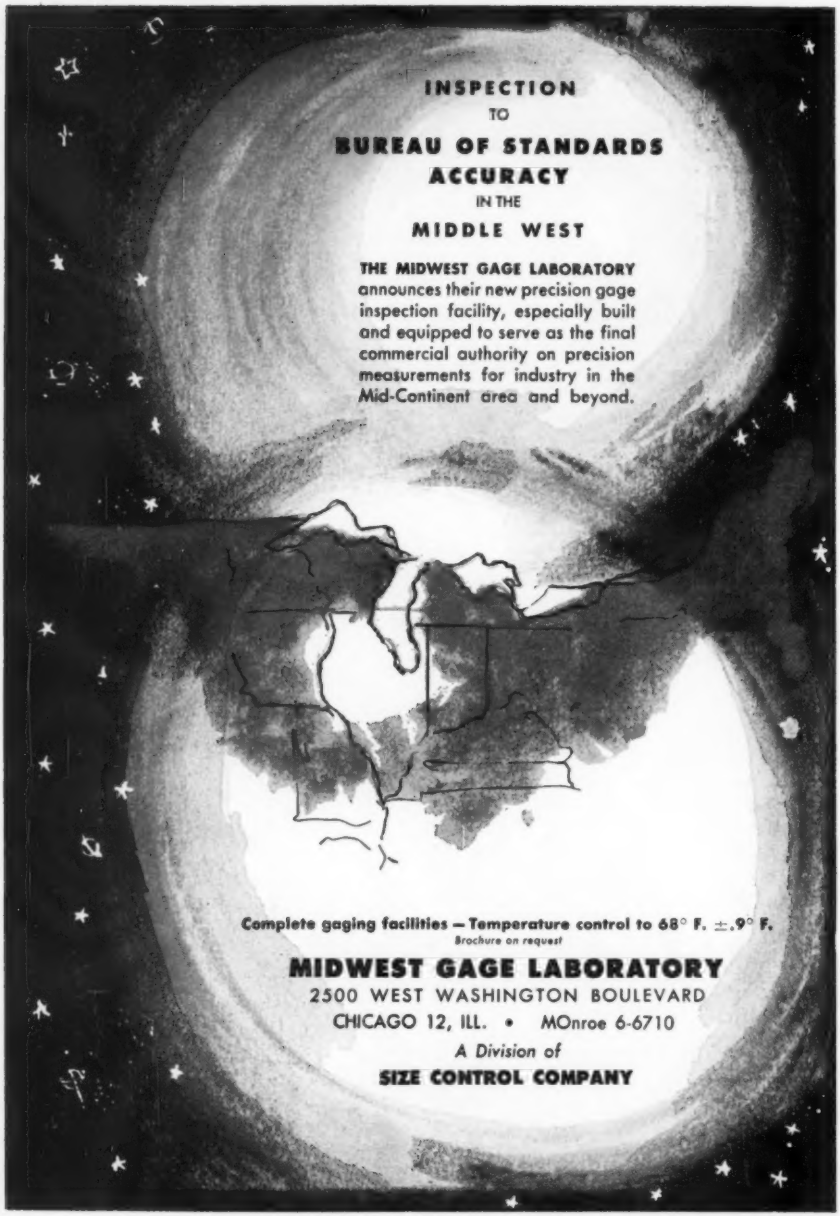
Gilbert radials have 9 or 11-inch columns; 12 spindle speeds in each of 3 ranges; 6 power feeds, .003" to .020". Tap leads are available. *Delivery in 30 days or less.* As the Chrysler Airtemp story shows, "those who buy Gilbert buy Gilbert again." Get full data on the Gilbert's many advantages.

Write for Bulletin 349 today. ▼

GILBERT

RADIALS • BORING MILLS • ACCESSORIES

THE CINCINNATI GILBERT MACHINE TOOL CO., 3366 BEEKMAN ST. • CINCINNATI 23, OHIO


INSPECTION
TO
BUREAU OF STANDARDS
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THE MIDWEST GAGE LABORATORY announces their new precision gage inspection facility, especially built and equipped to serve as the final commercial authority on precision measurements for industry in the Mid-Continent area and beyond.
Complete gaging facilities — Temperature control to 68° F. ±.9° F.
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SIZE CONTROL COMPANY

within 24 hours? . . . The constructive solution to the dilemma of foreign sales would be for the State Department to prevail upon various foreign governments to relax nationalistic policies, eliminate special taxes and restrictive regulations, and permit American machine tools to enter foreign countries on an openly competitive basis such as prevailed before World War II."

Getting back to the problem here at home, Mr. Tigges went on to say: "If we are going to build up our preparedness for possible attack, obsolete machine tools in American metalworking plants must be replaced by new and modern machines before the emergency happens. The owners of these metalworking plants are not going to replace old machines unless we in the machine tool industry go out and sell them on its necessity. We must make the replacement of old machines by new ones so attractive to the metalworking industries of the country that they will modernize their plants to the degree required for the continuing protection of the United States."

Tigges summarized today's modernization incentives as follows:

1. The change in the depreciation provisions of the Internal Revenue Code, plus a new Internal Revenue Department policy, which together will enable many machine tool buyers to get a shorter write-off period than was the case in the past;

Louis Polk

M. A. Hollengreen

2. The accelerated rate of invention, design, and development which has been continuing in the machine tool industry since the end of the Korean emergency;
3. The forthcoming Machine Tool Show to be held in Chicago next September, where the operating executive can see in operation, and compare, the various makes and types of machines that may be appropriate for his replacement requirements.

The meeting was attended by some 300 top executives of America's machine tool building companies, representing about 90% of the industry's capacity.

An election of officers for the National Machine Tool Builders' Association resulted in the following appointments.

Milburn A. Hollengreen, president and general manager, Landis Tool Co., Waynesboro, Pa., was elected president.

Louis Polk, president, the Sheffield Corp., Dayton, O., was elected first vice-president, and **Jerome A. Raterman,**

Jerome A. Raterman

John C. Cotner

Henry D. Sharpe, Jr.

Perrin G. March, III

president, Monarch Machine Tool Company, Sidney, O., was elected second vice-president and director. **John C. Cotner,** president and general manager, Hydraulic Press Mfg. Co., Mount Gilead, O., was re-elected treasurer.

New directors elected, in addition to Mr. Raterman, were: **Henry D. Sharpe, Jr.,** president, Brown and Sharpe Mfg. Co., Providence, R.I., and **Perrin G. March, III,** president, the Cincinnati Shaper Co., Cincinnati, O.

Tell Berna was reappointed general manager of the association. **Mrs. Frida F. Selbert** was re-elected secretary.

Fire destroys part of Ohio plant

Fire of undetermined origin destroyed a portion of the plant housing the manufacturing facilities of the O. J. Heimann Manufacturing Co., Urbana, Ohio, recently.

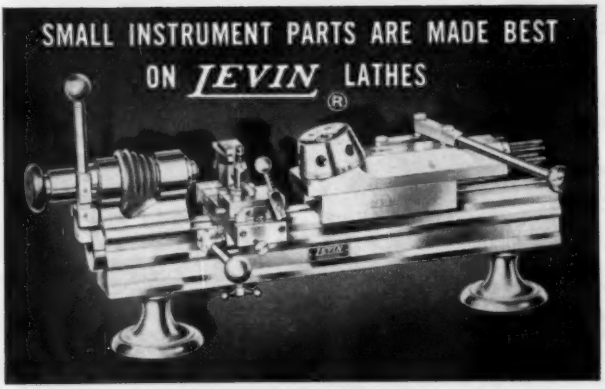
While manufacturing operations were halted temporarily, the company continued making shipments of orders from its warehouse stocks, which were untouched by fire.

At the National Metal Exposition, Chicago, in November, The Action Diamond Tool Co., Chicago, held a drawing for a .80 blue white diamond. Winner of the stone was H. Patterson, design engineer, B & B Engineering Co., Grand Haven, Mich. Pictured from left to right: W. Clinard, Robert Byrne, Gordon E. Weaver, Mrs. W. Clinard, who was picked from observers to draw the lucky card, G. Owen, and Howard Vehmeier.

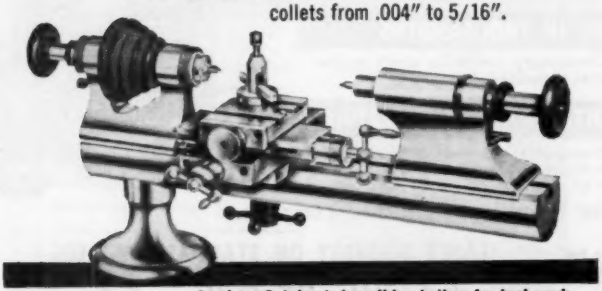
First Metal Finishing Show Produced by Behr-Manning

A preview of tomorrow's polishing departments in automobile and appliance manufacturing—and the latest in production grinding and finishing machinery for the metalworking industry—was held at the new Behr-Manning headquarters and warehouse in Chicago, where some 72 new machine tools using modern coated abrasive belts were shown by 38 manufacturers at a first national Metal Finishing Show and Conference.

Of significance was the assembly in one place for the first time, of the 50 technical specialists from machinery and coated abrasive manufacturing firms. These specialists conferred with 2,000 operating heads of polishing depart-



Twenty-three models for all types of work. 4″ swing, Bed Length 12″ or 18″; over 100 stock sizes of collets from .004″ to 5/16″.



Send for Catalog L describing Lathes for tool work, second operations; turrets and full line of accessories.

LOUIS LEVIN & SON, INC., 3610 So. Broadway, Los Angeles 7, Calif.

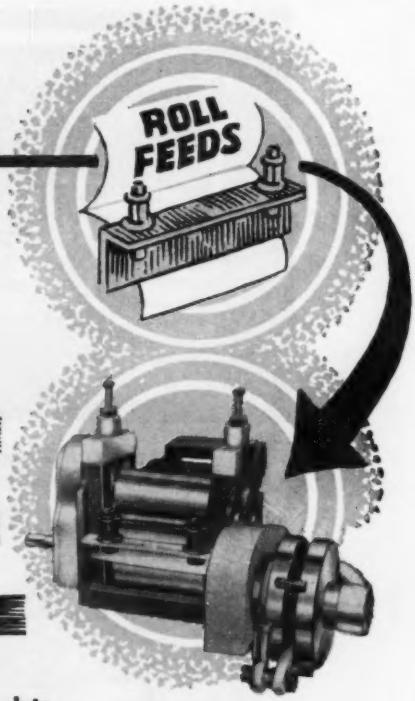
ments who had been urged to "bring parts, polishers and problems" to this "proving ground for '55 production".

Workpieces ranging from auto bumper guards and garnish molding, through die castings, small parts and sheets of strange new metallurgical structure, were brought into the hall by production men and designers and actually polished on models of the new apparatus.

New items in the field

New approaches to machine tool versatility with the coated abrasive belt included the biggest microfinisher vet built (30 inches wide) for tandem prepolishing of steel strip before forming rather than after, a twin-belt surfacer which will do both sides of flat workpieces at once in continuous line production, and a grinder which will hold

"RFC" ROLL-FEEDS



FITS ANY PRESS
For side or rear feeding. All attachments for installing furnished, including disc and connecting linkage.

CAN'T SLIP
Each wedge has four points of contact to safeguard accuracy.

REVERSES INSTANTLY
Merely shift feed finger spring from one lug to the other.

FEEDS IN THOUSANDTHS
Amazingly accurate stock movement assured.

MAINTAINS ORIGINAL SETTING
Regardless of use or wear. No ratchets or pawls to wear down and "Throw off" feed spacing.

Ready for mounting! Furnished complete.

Write today for latest Bulletin.

EARLY DELIVERY ON STANDARD MODELS

Roll-Feeds Corporation

ASHTON, R. I.

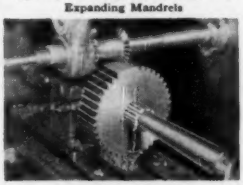
tolerances to half of one thousandth of an inch in sizing webs of rubber, mica, laminated plastics, masonite and other non-metallics so widely used today in conjunction with steel in appliances, aircraft and automobiles.

Ingenuity in small tools for precision grinding and polishing has begotten several idler-and-extension attachments for adapting existing grinding spindles to contact-wheel and belt usage—for contouring jobs, longer abrasive life, and the ability to use the new grits, grades, widths and backings now available in belts. One new small unit runs twin belts off a single motor for deburring and blending. Another uses the yoke principle of contact wheel support to permit exceptionally small contact wheels (down to one inch) and reach through small openings and corings.

The latest in backstand idlers is a

This faster—simpler expanding mandrel speeds production on all types of operation. Sleeve provides maximum bearing surface for positive holding of work without distortion or marring.

Typical precision operations using "K-O" Expanding Mandrels



Ask your nearest Mill Supply House or Mail the coupon TODAY.

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unit with a 6-inch macerated plastic pulley adjustable for tension and tracking from the operator's normal working position, and employing a double-lever arc method of adjustment for tracking which doesn't strain the belt in any way.

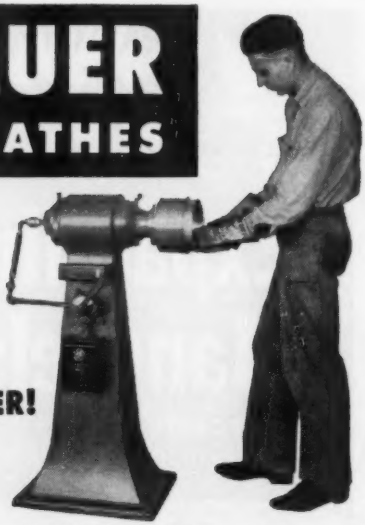
The wide variety of contact wheels shown was of high interest. One wheel featured a plastic expendable hub to circumvent tire-changing or the discard of costly hub constructions after protracted wheel use.

Several of the new pieces of equipment featured the platen method of achieving belt-work contact, in both horizontal and vertical orientations. Platen pressure reduces "dubbing" at the edges of sharp-edged work.

According to Behr-Manning's Arthur W. Bell, midwest regional manager, "the new coated abrasives, contact wheels,

SCHAUER
SPEED LATHES

FINISH
SMALL PARTS
FASTER, CHEAPER!



Polishing cooking ware is just one of many *jobs performed by Schauer Speed Lathes.*

Schauer Speed Lathes are used by leading manufacturers to handle an extremely wide range of secondary finishing operations on metal and plastic parts. They perform *many* jobs—filing, trimming, de-burring, lapping, polishing—in *less* time and at *lower costs*. Single speed, two speed, variable speed models. Chuck, collet and vacuum holding fixtures. Investigate their advantages for your production. You'll *save* with Schauer!

WRITE FOR BULLETIN 500

SCHAUER MANUFACTURING CORP.

4502 Alpine Ave., Cincinnati 36, Ohio

lubricants, machines and polishing techniques which have made this conference and showing possible, represent along with the new transfermatic tools the hottest corner of equipment development in the machine tool industry—and open the door to remarkable production economies just when industry needs them most."

PSC completes negotiations to buy Clearing Machine Corp.

Pressed Steel Car Company, Inc., New York, has completed negotiations for the acquisition of the Clearing Machine Corp., Chicago. Clearing manufactures a full line of industrial presses.

E. V. Nielsen and Basco move to new quarters

E. V. Nielsen, Inc., sales agents for Basco sheet steel separators, have moved the manufacturing, sales, warehousing, and display facilities of these firms to 128 Broad St., Stamford, Conn.

Robert (Scotty) MacKay

It is with deep regret that the Machine and Tool Blue Book announces the sudden death, on Nov. 17, of Robert MacKay, for six years art director of Hitchcock Publishing Co. at Wheaton, Ill. Mr. MacKay was a native of Scotland, coming to the United States in 1911. He was 61 years old.

Mr. MacKay's work included the designing of the cover for each issue of this publication. The Christmas cover on our December book was his last; a fitting conclusion, we believe, to this phase of his career.

Podlin Tool moves

Podlin Tool Co. has recently moved to its new quarters at 11849 Franklin Avenue, Bensenville, Illinois, a suburb of Chicago. It has acquired a 25 acre tract of land on which it plans to build a number of small and medium sized factory buildings.

The machine shown here was built by Rehnberg-Jacobson, to perform a series of drilling, tapping, and reaming operations.

MAKE IT YOURSELF?

You can do it with **R-J UNITS**

Rehnberg-Jacobson ALL-MECHANICAL Drill, Tap, and Index Units are specially designed for YOU to use for making up YOUR OWN special-purpose machines — or for adding to or modifying some of the special-purpose (or standard) machines you now have. They are accurate, efficient, economical — and available in enough models and sizes to suit most every need. WRITE TODAY for Data Sheets giving complete *engineering information.*

TAP UNITS, for example, are made in four capacities from 5/16 - 18 and 1-1/4" stroke to 1-1/2 - 6 and 4-1/2" stroke. They are self-contained, with lead screw feed.

REHNBERG-JACOBSON MFG. COMPANY

2135 KISHWAUKEE ST., ROCKFORD, ILLINOIS

A development that is making grinding wheel history

NOW!

Cincinnati Grinding Wheels offer

Positive Duplication

Positive Duplication is undoubtedly the most important grinding wheel development in years. For through the CINCINNATI (PD) Manufacturing Process you are assured a Positive Duplication of the original wheel *every* time you reorder.

"On grade" with a CINCINNATI (PD) WHEEL means all future (PD) WHEELS will *act and grind exactly alike. Yet they are priced no higher than ordinary wheels.*

Let us prove to you how CINCINNATI (PD) WHEELS can save you money and increase your production. Just contact us and we'll send one of our representatives—men who know grinding and grinding machines as well as grinding wheels. Write, wire or telephone Sales Manager, Cincinnati Milling Products Division, The Cincinnati Milling Machine Co., Cincinnati 9, Ohio.

Just as a NEGATIVE guarantees you an exact duplication of a photograph each and every time, you are always assured a . . .

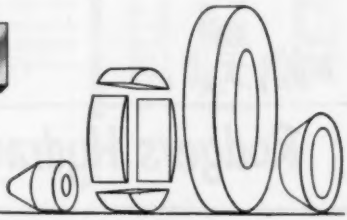
. . . POSITIVE DUPLICATION of an original grinding wheel each and every time through the CINCINNATI (PD) Manufacturing Process.

CINCINNATI

Grinding Wheels

THE CINCINNATI MILLING MACHINE CO.

Cincinnati 9, Ohio



this

RODGERS PLATEN PRESS

produces

GRIDDLES

at a sizzling rate!

Ever since they changed from a mechanical press to a Rodgers 100 ton Hydraulic Platen Press, Northland Aluminum Products of Minneapolis has reported they are not only pleased, but also surprised at the unusual results. No wonder! . . . production is up . . . product quality and finish is better . . . die wear is reduced . . . and die setup time is less. All these advantages are vitally important to Northland for they make a variety of products like Nordic Ware Aluminum Utensils, Griddle King Griddles and Steak Platters.

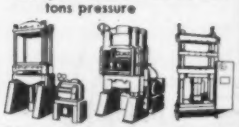
Although you may produce an entirely different line of products you probably would find a Standard Rodgers Platen Press would offer you the same advantages . . . whether your jobs are stamping, forming, drawing, coining, or die try-out . . . in metal or plastics.

Write for the new Illustrated Rodgers Blue Ribbon Catalog

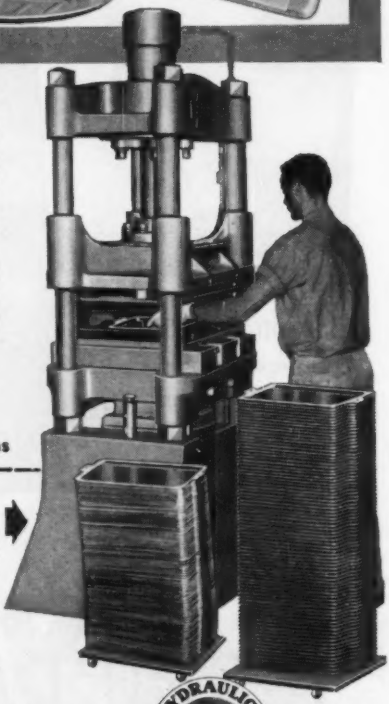
it gives complete details and specifications

RODGERS BLUE RIBBON PLATEN PRESSES FOR:

- Metal Drawing and Forming
- Plastic and Rubber Molding
- Die Try-Out General Assembly and Utility Work
- Capacities from 10 to 500 tons pressure



Here is the Rodgers 100 ton Hydraulic 24"x24" Platen Press which blanks and forms Northland Griddle Kings at the rate of 8 per minute. Aluminum is .153—finished size is 10¾" x17½".



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Shop HINTS

Simplified production chamfers

By **Harold D. Rhodenbaugh**

In doing hand screw machine work on bar stock the outside diameter, end chamfering operation is, with few exceptions, a function of every setup; and because of its simplicity, not enough attention is paid to the setup location of the chamfering tool.

O.D. end chamfering can be done from

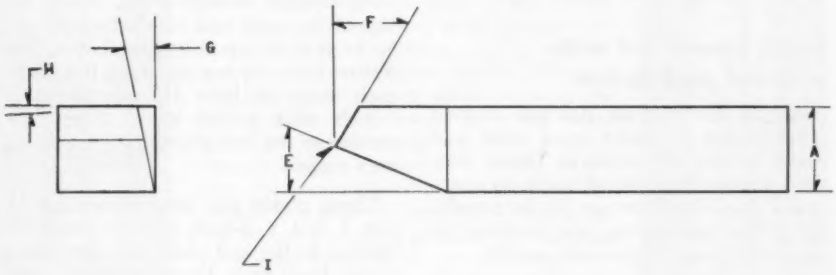
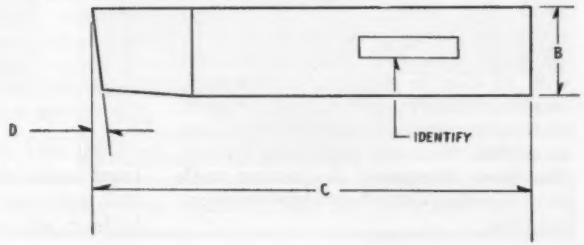


FIG. 1



the square turret, the rear tool post or the hexagon turret. In many shops the setup location of the end chamfering tool is left up to the prerogative of the jobsetter or operator.

Chamfering from the square turret or rear tool post is as effective as chamfering in the hexagon turret, but it is more expensive to do so.

Whenever possible it is well to set the end O.D. chamfering tool in a knee tool holder mounted in the hexagon turret. In many cases this setup will cut the cost of the chamfering operation approximately 50%, in that the operator can move the hexagon turret forward with swift accuracy and execute the operation, index, and start the next cut before he could crank the cross-slide into cutting position.

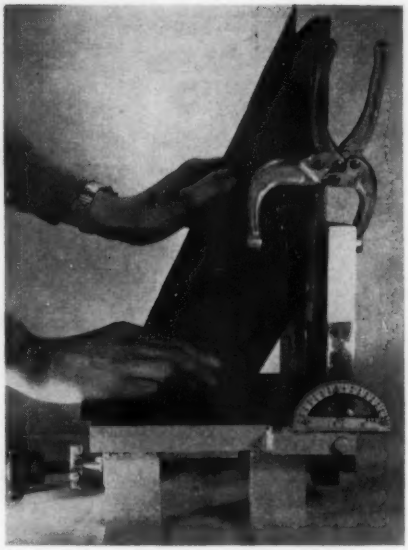
Figure 1 shows a method of standardizing hexagon turret end chamfering tools ground to be used in the Warner & Swasey knee tool holder M-1863.

Angles formed fast with weld and check fixture

Angles for aircraft jigs are formed quickly and precisely on a weld and check fixture developed at Temco Aircraft Corporation, which saves an average of five manhours per jig by simplifying the positioning and welding of open and closed angles and gussets.

At the Dallas, Tex., plant, where tooling is underway for production of B-52 fuselage sections, as many as 2,000 angles are used in a single jig. Sides of these angles range up to 22 inches long.

Welders formerly held angle sides together by hand while they tacked them with an electric arc. If a welded angle was inaccurate by four degrees or more, machining usually removed more material than thickness minimums allowed. The least inaccuracy in joining angle sides together caused excessive machining time.



Jig-builder Woodrow W. Keas designed the weld and check fixture, and he built it in less than four hours. The fixture has a back plate and a bed plate, each made of 10 x 10-inch pieces of 1-inch cold rolled steel. Four feet, welded to the bed plate, are 3 x 3 x 2½-inch angles.

These plates are hinged together by two 1 x 1 x 3-inch hinges. They are welded to the bed plate and are joined to the back plate by two ½ x 1½-inch dowels. This allows the angle formed by the back and bed plates to be opened and closed.

Closure is regulated by a ½ x 13-inch threaded bolt. It runs horizontally through a block welded to the bottom of the bed plate and through a swivel block which is secured by dowels to the bottom edge of the back plate.

Two star nuts are attached to the front end of the bolt. The fixture operator turns one nut to tilt the back plate to form any angle from 30 to 180 de-

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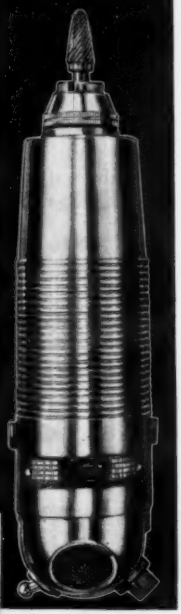

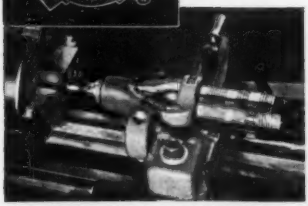

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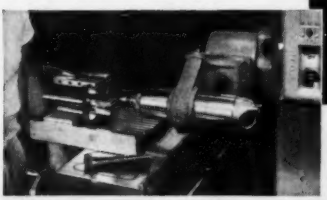

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grees. He turns the other to lock the back plate at the desired angle.

Setting up the weld and check fixture takes less than a minute, and tacking the angle is almost as simple.

One angle side is placed horizontally on the bed plate. The other is placed upright, flush against the back plate. Both sides are secured to their respective plates with C-clamps.

The angle is established by turning the star nut until an indicator, on one edge of the back plate, is opposite the desired degree mark on a protractor, mounted on top of one hinge.

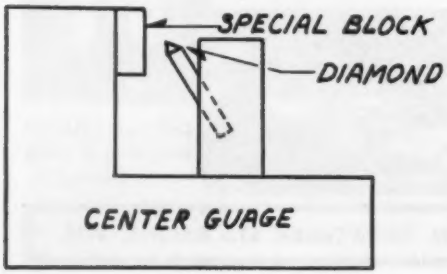
Then the fixture is locked with the other star nut, the gusset is placed in position and tacked, and angle sides are tacked together. Then C-clamps are loosened, and the angle is removed for final gas or electrical weld.

These angles already are true to within one degree when they are ready for machining. This has reduced machine time an average of 10 minutes a unit since the new weld and check fixture has been in use.

Time saver in using diamond dresser

On certain grinders, when sharpening cutters with a radial face, it is necessary to set the diamond dresser on dead center. This is done with a gage that comes with the grinder. But cutters that have a rake or hook angle on the face require the diamond dresser to be set back of dead center. Since the rake angle is often given in thousandths of an inch, it becomes necessary to use a feeler gauge with some appropriate piece of metal to insert between the diamond and the face of the gage.

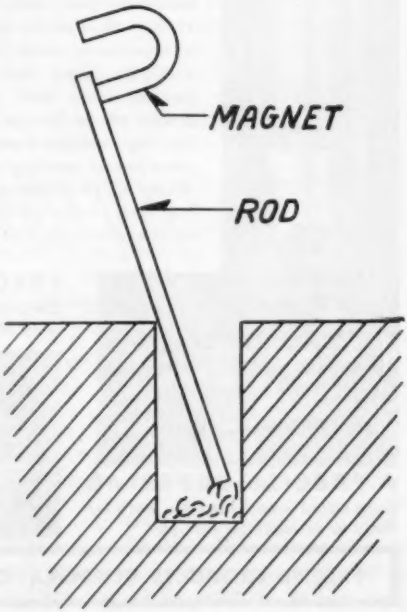
As a time saver in making this adjustment, Theodore Brownell, an Allis-Chalmers tool cutter, made small metal blocks of the exact width or thickness needed for each angle. Now when he gets a cutter with a rake angle, he simply takes the block made for it and quickly and easily sets the diamond.



Magnet draws out chips

by **Federico Strasser**

When it is impossible to take out steel chips, small iron pieces, screws, rivets, pins, etc., from the bottom of a hole by hand, it is well worth while to have a permanent magnet with a small gauge iron rod close by. The rod, in contact with the magnet, becomes itself a magnet, and the small iron or steel pieces adhere easily to the rod, and thus are removed from the hole.



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Adjustable turret lathe stop for long parts

By **Roger Knutsen**

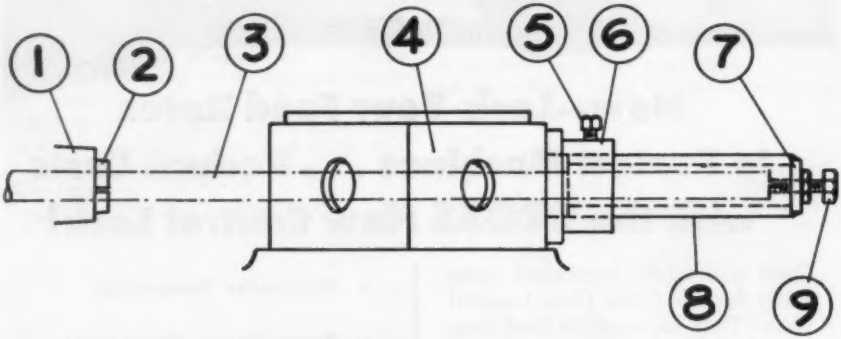
After machining one end of long parts made of bar stock in the turret lathe it is sometimes impossible to use the standard type of bar stock stops for the cutting-off operation, because the turret cannot be backed up far enough.

To overcome this difficulty, this simple, adjustable stop was devised to work from the rear end of the turret.

Before the cut-off operation, the turret (4) is indexed to an empty station and the bar stock is advanced through the turret. Opposite the empty station the stop is clamped into a tool holder (6) with help of the clamping bolt (5). The stopping device consists of a tube (8), machined on the outside of one end to fit into the tool holder (6), the end plate (7), which is welded to the end of the tube (8), and an adjusting screw (9) with locknut.

When the barstock (3) is forced against the end of the adjusting screw (9), the collet chuck (1) is tightened and collet (2) holds the barstock for the cut-off operation.

After completion of the cut-off operation, the turret must be indexed to allow the removal of the finished part.



Shell trimming and beading covered in one operation

Dayton Rogers Manufacturing Co., of Minneapolis, recently tooled a complete job on shell trimming of an aluminum drawn shell. This included the beading or forming of the 1/16" offset.

The accompanying drawing shows the setup. The hold-down box (a), a fixture, was made to fit the outside dimensions of the oblong shell, and after the drawn shell was placed in working position on the trimming and beading mandrel (b), the hold-down box was placed over the shell. With the hold-down (c) in working position, the external cutter and forming tool was engaged. The drawn

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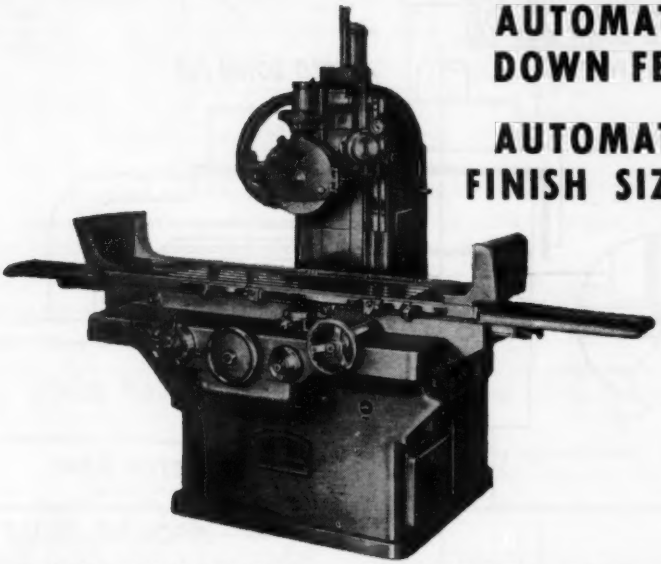

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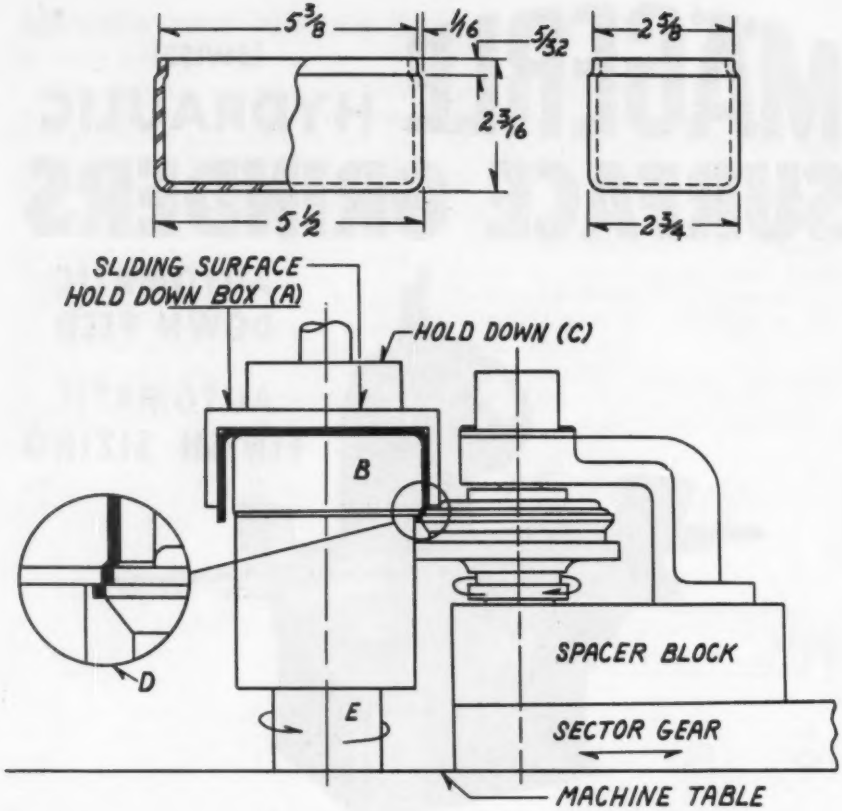


shell as shown at (d) was thus trimmed, beaded or formed, in one cycle of the work spindle (e).

There is a sliding or moving action between the hold-down box (a) and the hold-down spindle (c).

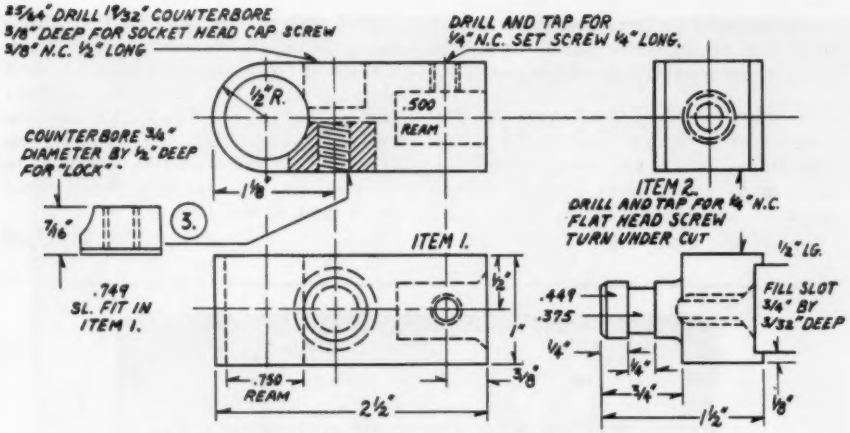
This type of work is commonly required on drawn shells, on aluminum, steel, brass and copper. The battery box has a lid that is drawn and trimmed and which fits on the top of this formed, drawn aluminum piece.

Faster, safer setups for cutter grinding

A procedure for faster and safer setups for cutter grinding on helix-angle, spiral-fluted tools has been devised by Louis Warner, an Allis-Chalmers machinist.

Specifically, the procedure relates to a method of clamping and holding the finger holder to the upright post (1 & 3), and the swivel arrangement for the finger holder (2), as shown on the diagram.

Formerly, the finger holder was held



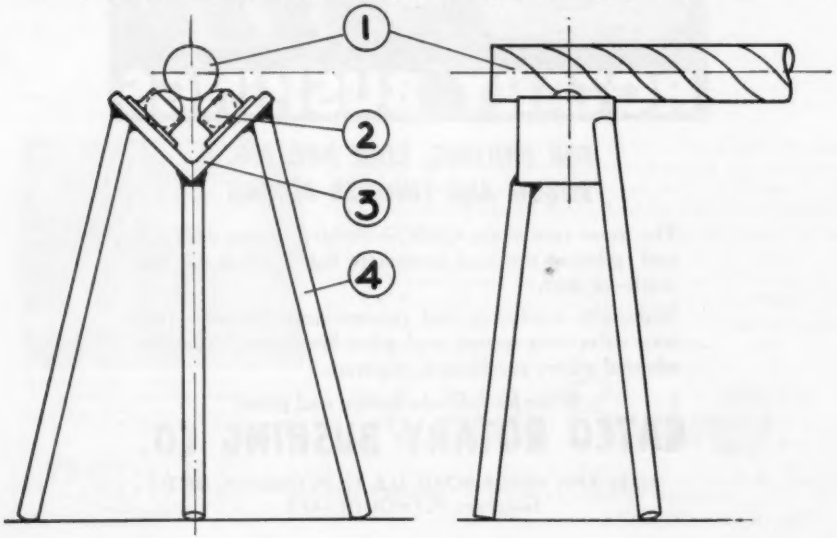
"LOCK" OBTAINED BY FACING 1/16" OFF OF ITEM 3 AFTER DRILLING AND REAMING .750 HOLE WITH LOCK IN POSITION.

by a set-screw which fastened directly onto the upright post. This left many set-screw marks which made the upright post useless within a comparatively short time.

Ball transfers aid in unwrapping operation

By **Roger Johnson**

Some types of barstock, as for instance "turned, ground and polished" steel, are shipped after they are wrapped in heavy, greased paper. To remove the

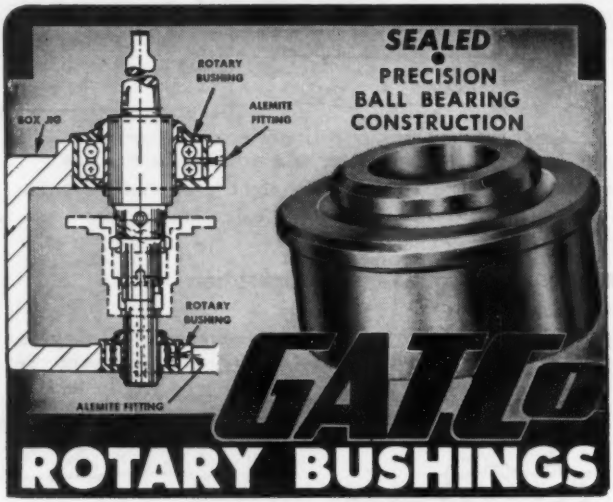


wrapping and the grease without excessive loss of time, two stands as shown here were used with great success:

A short length of steel angle (3) was welded to three steel legs (4). Two "ball transfers," which are readily available at a small cost and in a great variety of sizes, were bolted to the inside surfaces of the steel angle.

Two such stands, separated by a distance of approximately twelve feet, served to speed the unwrapping and cleaning of 20-foot bars; the operator just pulled on the wrappings and the ball transfers permitted an easy rotating of the bars. Ball transfers, contrary to disc rollers, also permit longitudinal movement of the bars.

The End



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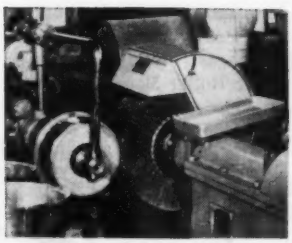

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On most "everyday" jobs a Sheldon will actually turn out more pieces per hour too. With double V-belts to the spindle Sheldon lathes deliver enough power to take heavy cuts in direct drive, at high speeds. Sheldon's "Zero Precision" Taper Roller Bearings permit work to the closest tolerances. Seldom are such extremely accurate bearings used in moderate priced lathes.

You will actually keep more as profit if you use Sheldon Lathes.

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What's New

New Type Screw Machine Has Important Innovations

A completely new automatic single spindle screw machine is being introduced by The Gear Grinding Machine Co., Dept. BB, 3935 Christopher, Detroit 11, Mich. Called the Screwmatic 750, the unit designed machine has incorporated three principles that are claimed to make it one of the most advanced manufacturing units in modern industry.

The Screwmatic 750 screw machine, product of the Gear Grinding Machine Co., Dept. BB, 3935 Christopher, Detroit 11, Mich., features: infinitely variable spindle speeds instead of gearing; work spindle drive through V-belts instead of roller chains; low pressure air cylinders for stock feeding instead of a constant speed backshaft.

Infinitely variable spindle speeds instead of gearing

The first of these is that an infinitely variable spindle speed drive has replaced gearing. This permits a maximum spindle speed of 5100 rpm's, with higher speeds available on request. Thus, advantage can now be taken of the higher recommended surface feet of brass and aluminum, as well as full advantage of carbide tooling. The spindle drive permits a choice of three different spindle speeds during any work cycle. All speeds are controlled by a dial setting and are adjustable during actual cutting. The reversibility of all forward speeds eliminates the need of left-hand tools. Instead of reversing by mechanical means, instantaneous activation is accomplished by air pressure.

V-belt work spindle drive replaces roller chains

The second principle of this new design is the V-belt work spindle drive in place of roller chains. An independently supported V-belt sheave drives the spindle by means of a clearance spline. Greater forming precision is claimed because the standard, anti-friction spindle bearings carry cutting tool pressures only. The spindle proper carries no drag from drive members or clutch bodies.

Chatterproof forming results from heavy section cross slides guided on vertically arranged dovetails. Slide unit is mounted upon deep wall supports. Slides are direct cam actuated with micrometer adjustment and concealed dead stops provided.

Tool alignment with work spindle is accomplished by the six station turret being held in precision needle bearings and locked in hardened taper bushings. The Screwmatic 750 accommodates standard turret tools of .750" dia.

Low pressure air cylinders for stock feeding

The third new principle incorporated is stock feeding through low pressure air cylinders instead of a constant speed backshaft. Using standard size collets and feeders, this machine takes bar stock up to .750" dia. Two and one-quarter inch stock lengths are turned with a standard 7" cam. Turning lengths up to 6 inches are obtainable with larger cams.

This unusual turning length capacity is made possible through a turret slide unit which includes the lead cam and drive. The turret unit is mounted horizontally and slides along the machine base. When positioned away from the work spindle, turret tools will machine 6" work pieces without crowding the tools or requiring cam cut downs.

The turret slide proper is equipped with a three position crank setting and the turret index drive with three index speeds. Together they permit turret index strokes of ¼, 1/3 or ½-second turret index times by simple adjustment. This arrangement widens the range of work which can be produced on one screw machine. This, together with the high spindle speeds for all jobs, makes the Screwmatic 750 a machine with great capacity and high output facilities.

Shorter work pieces are easily accommodated by the adjustable turret slide and index stroke and speed. Cam shaft cycle speeds range from 1.8 to 240 seconds.

Over-all design

Another feature of the Screwmatic 750 is the over-all design. Facilities for all commonly used attachments are provided. An open front, high wall cabinet permits maximum tool accessibility, effective oil splash protection, and provides a rigid base. The lead cam and

tool setup are completely visible. An open ended chip well is ample and deep. Chips can be removed from the well during machining operations.

Tool and cam layout simplified

The unrestricted tooling space provided by the cabinet, together with infinitely variable spindle speeds, are claimed to have simplified tool and cam layout computations. This means shorter down-time. Simplified forms of the machine can be supplied for long run production of simple parts.

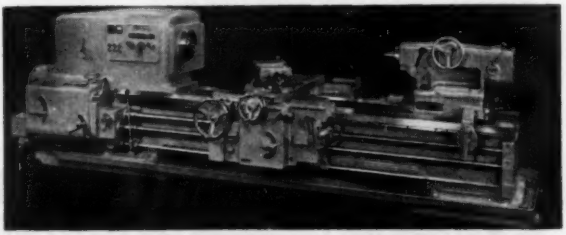
Use ACTION Card, opposite page 64. Encircle No. 1

Monarch Machine Opens Demonstration Center

A new demonstration center just completed by the Monarch Machine Tool Company, Oak Ave. & Maple St., Sidney, Ohio, will permit display of the 15 latest models of the company's lathes. Craneways and power lifts facilitate the moving of machines and of work into and out of them.

Each machine will be under power so that it can be demonstrated on work provided by the visiting customer or by Monarch. Among the turning machines scheduled for demonstration are several sizes of high speed Model EE precision lathes; a number of Mona-Matic lathes; three Series 61 engine and toolmakers' machines; five heavy duty machines, three of them air gage tracer equipped, and one with the new Motor Trace controls; and a completely equipped Speedi-Matic precision hand screw machine.

Use ACTION Card, opposite page 64. Encircle No. 2



The new Series 90 Dyna-Shift lathe, being shown at demonstration center of the Monarch Machine Tool Co., is claimed to make it easy for the operator to choose just the right surface cutting speed for any work diameter.

Get a better "SURFACE GRINDER" job at less cost

New **Chatter Resistant, Spring Loaded Spindle

Let us put this spindle in your old radius dresser - - $5.00

RADIUS DRESSER $39.00 **ANGLE DRESSER $44.00**

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Hardened shaft—bearing adjustable for wear. Diamond always perfectly centered. Easily set adjustable 180° stops.

10" Wheel size for DoAll and NORTON Grinders—$44.00. Diamond $7.00.

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Ball Thrust Bearing. 24 Precision Ground Surfaces. Can be set very accurately with a Protractor or Sine Bar. Works underneath the wheel. Large Bearing surfaces.

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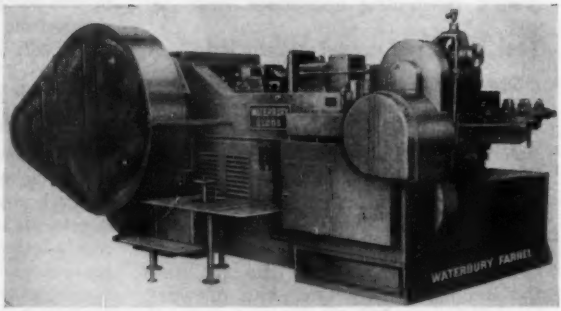
New ½" solid die header



Waterbury Farrel Foundry and Machine Co., Dept. BB, Waterbury, Conn., has developed a new ½" "Waterbury" solid die double stroke header, which is claimed to produce headed blanks up to 6" long from an 8" maximum wire cutoff, at 80 per minute, and shorter blanks (up to 3½") at 100 blanks per minute.

Header is built in both long and short stroke, with the crankshaft throw the only difference in construction.

Wire is fed from the coil by a positive roll feed to the cutoff, a pair of thick blades held in slides. Wire blanks are then transported from the cutoff slides to the heading die by an independent transfer mechanism. After being headed, blanks are ejected from the heading die by a knockout mechanism. Accessible adjustments are provided to compensate for wear and to retime these mechanisms in relation to one another when it is desired to do so.

Punch knockout, timed ejector and

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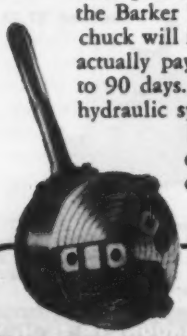
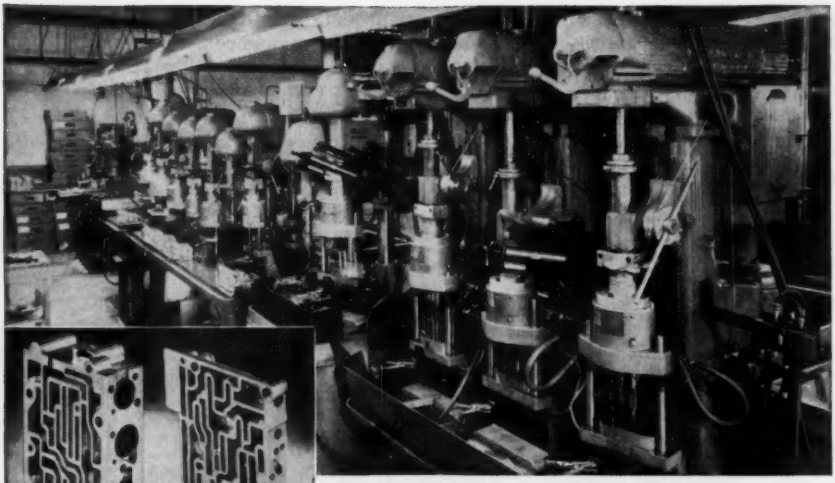
Will pay for itself in 60 to 90 days

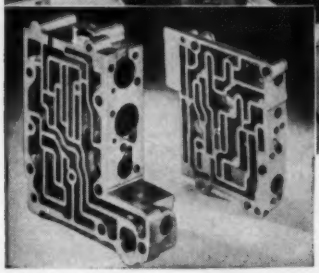
On turrets, engine lathes, cutting-off machines, drill presses or any type of chucking machine, the Barker Two-Jaw or Three-Jaw hand operated chuck will increase production up to one third and actually pay for itself while doing it in from 60 to 90 days. Hand lever eliminates pneumatic and hydraulic systems, yet closes and locks jaws with lathe running or stopped. Over 30 years of labor saving, production boosting operation.

Write for bulletin 201 today.



CHUCK DIVISION
THOMAS HOIST CO.
24 S. HOYNE CHICAGO 12, ILL.





51 holes in cover and valve body vary in diameter from 1/16" to 13/16".

HERE'S HOW ZAGAR TOOLING SAVED MONEY HAND OVER FIST

This aluminum die casting is processed in its entirety by Zagar planning, except for milling two faces. Two lines of Zagar standardized self-clamping drill jigs ream, tap and drill both valve body and cover. With 24 heads and 24 fixtures, Zagar performs work on 51 holes on close centers. Step tools take care of reaming and burnishing. The fixtures were designed to compensate for slight inaccuracies in the die casting. Thus has Zagar engineering solved an acute problem of limited production without the purchase of costly special machines.

Write for Bulletin "B-1".

ZAGAR TOOL, INC.
24000 Lakeland Blvd., Cleveland 23, Ohio

Zagar
TOOLS FOR INDUSTRY and SPECIAL MACHINERY

knockout relief mechanisms can also be supplied with machines, to increase their versatility in heading special shapes.

Use ACTION Card, opposite page 64. Encircle No. 3

Boregages eliminate need for plug gages

Adjustable Boregages manufactured by the M. C. Hutto Co., Dept. BB, 6516 Detroit Ave., Cleveland 2, Ohio, are claimed to provide a major advance in simplification and cost reduction of bore gaging. Fifteen sizes are available for measuring holes from .995" to 6.005".

Unit consists of a light pencil-size handle connected by adapters to fixed adjustable torus-design gages at each end. One gage is set to "go," the other to "no-go" dimension. This double end gage has removable washers for recording dimensions to which gages are set.

LAPEER CLAMPS BOOST TV TUBE PRODUCTION 15-20% AT RCA

Operator placing a tube in position. Note the Lapeer clamps.

At Radio Corporation of America, Lapeer special kinescope clamps are paying off in stepped up production in applying the phosphor to the faces of TV picture tubes. Gains from 15 to 20% have been registered.

Boosted output is obtained through the compact design of Lapeer clamps—permitting closer spacing and the installation of more fixtures on the traveling belts used in the operation.

Because the coating on tube faces must dry evenly, without ripples, it is important, too, that there be no vibration during clamping. Easy to operate, Lapeer clamps overcome this hazard. It's probable that Lapeer experience can help solve your clamping problems, too. Write for catalog—today.

Sales offices in principal cities—Teletype DE 49

KNU-VISE PRODUCTS LAPEER MFG. CO.

3052 DAVISON ROAD • LAPEER, MICHIGAN

WESTERN DIVISION: 422 MAGNOLIA, GLENDALE, CALIF.

CANADIAN DIVISION: HIGGINSON ENGINEERING, HAMILTON, ONT.

4122

INCREASES PRODUCTION...

LOWERS COSTS...

PAYS FOR ITSELF QUICKLY...

*The ROUSE HAND MILLER is a widely used, inexpensive, high speed, ball bearing, motor driven machine for handling light cuts in brass, aluminum, steel, plastics, and other materials—fast, accurately, and at very low cost. Only $110.00**

Fixtures (illustrated) extra.

*Motor equipment:—1/4 H.P. 110 Volt AC 60 cycle, single phase, swivel motor mount and light—$36.00**

**All prices FOB Chicago.*

★ **MILLS SMALL PARTS MUCH FASTER.**

★ **DRASTICALLY CUTS YOUR INVESTMENT IN EQUIPMENT.** Replaces expensive production machinery—or releases it for other jobs.

★ **INEXPERIENCED HELP CAN OPERATE IT.** Safe, simple, fool-proof operation.

★ **NO MORE COSTLY SET-UP TIME. $110.00*** price so low that it pays to keep one or more Hand Millers always set-up for special operations.

★ **YOU GET A BETTER PRODUCT**—the result of ABSOLUTE ACCURACY.

★ **A LOSS BECOMES A PROFIT** when marginal pieces are finished on the Hand Miller instead of on high cost equipment.

★ **VERY LOW MAINTENANCE.**

★ **USED REGULARLY IN 1163 MANUFACTURING PLANTS** (some of which use as many as 30 machines)—yet on the market a scant few years.

★ **UNIQUE—VERSATILE.** Nothing else like it. One or several machines can be the answer to some of *your* production problems.

Write today for further information.

H. B. ROUSE & COMPANY
2214 N. WAYNE AVE., CHICAGO 14
50 YEARS OF SERVICE TO INDUSTRY

Save Costly Regrinding!

Anderson

NEW, IMPROVED HAND SCRAPER

After the original regrinding most users of this new Anderson hand scraper find that only honing is necessary. Judge for yourself: Order as many Model 5-D scrapers as you want. We'll send them promptly. Use them a full week . . . if they don't live up to all your expectations, send them back to us for refund.

Faster Cutting
Easier to Use
Just the Right Spring
Palm Fitting Grip
Light in Weight
18" — 20" — 22" lengths

$5.80... with high speed steel blades

$8.50... with carbide-tipped blades

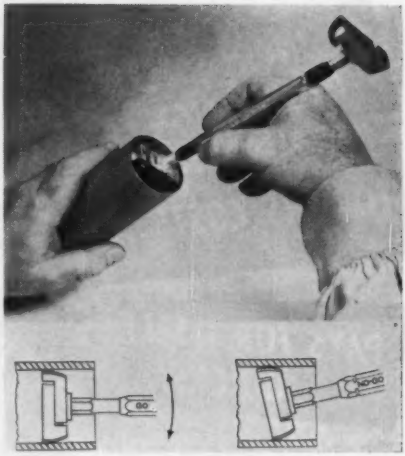
$1.50... for rubber bumper shown below

ORDER AS MANY AS YOU NEED MONEY-BACK GUARANTEE

Indicate choice of high-speed steel or carbide-tipped blades, and 18", 20", or 22" lengths. We suggest you include rubber bumpers in your order. Write today

For Bulletin No. 1-5

ANDERSON
BROS. MFG. CO.
1907 Kishwaukee St.
ROCKFORD
ILLINOIS



Short sections at ends of handle are green and red to indicate "go" and "no-go"; notches also are cut in "no-go" end for identification by feel.

When a hole is within tolerance, the "go" gage rocks freely without forcing and the "no-go" gage binds. If any other result is obtained in gaging, the hole is not within tolerances.

Torus design is claimed to afford instant entry into bore; detects bell-mouth, taper, out of round; eliminates questionable tolerances. When gage is rocked in hole, it is possible to feel variations in dimensions within .0001".

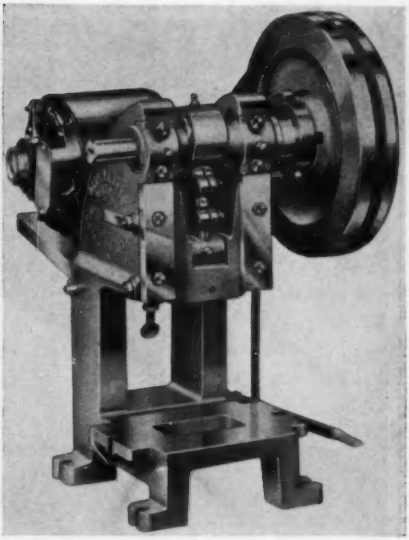
In photograph, Boregage is being used to check bore of cylinder. Drawings show how "go" and "no-go" gages indicate tolerances.

Use ACTION Card, opposite page 64. Encircle No. 4

Two-ton bench type punch press

The Model B-2 2-ton power bench type punch press recently developed by Alva F. Allen, Dept. MTB, Clinton, Mo., can be used for production of small stampings and for assembly or secondary operations.

Press has a quick action, single pin clutch with non-repeat or repeat action. Straight ram guides with flat gib are



claimed to give accurate fitting of dies for precision stamping. In many cases, on short runs, punches and dies can be made from cold rolled stock.

Model B-2 has a capacity of up to 200 operations per minute on continuous operations; requires only 1/3 hp motor; has direct V-belt drive; ¾" stroke.

Use ACTION Card, opposite page 64. Encircle No. 5

Adjustable-torque driver for lead screw tapping

A special releasing driver with a spring-loaded shank to accommodate lead screw tapping has been announced by Scully-Jones and Company, Dept. B, 1901 S. Rockwell St., Chicago.

The adjustable-torque clutch mechanism operates on the "safe-torque" principle, a method that is claimed to assure complete release and eliminate objectionable friction, heat, wear, and impact action.

There are no slipping friction surfaces or overriding teeth in the new design. A roller drive provides free-wheeling releasing action, protects threads, and

SPECIFY KASSON PRECISION
COLLETS AND ATTACHMENTS
IMMEDIATE DELIVERY FROM STOCK
3AT, 3C
1A, 4C
5C
480
(AC-50)
All collets in hexagon, square and round.
FOR ATLAS • LOGAN • SOUTH BEND
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DRAWBAR
½" cap.
Let us quote on your quantity orders for any type of collet, like, center or other machine tool attachment!
LIVE CENTER
(Ball Bearing) Double sealed for accuracy.
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Precision
KASSON Precision products are guaranteed unconditionally for accuracy, fit and long life. Your dealer should have them
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32-14 Northern Boulevard
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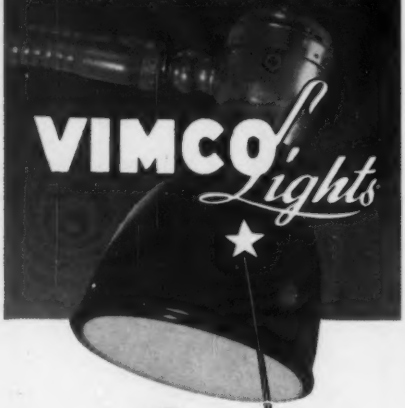
Integrity Since 1919

A COMPLETE LINE of SUPPLEMENTARY LIGHTS

VIMCO Lights



Vimcolights pay their own way in more accurate, steady machine production. "On the Spot" lighting eliminates eye straining shadows and supplement insufficient plant lighting.

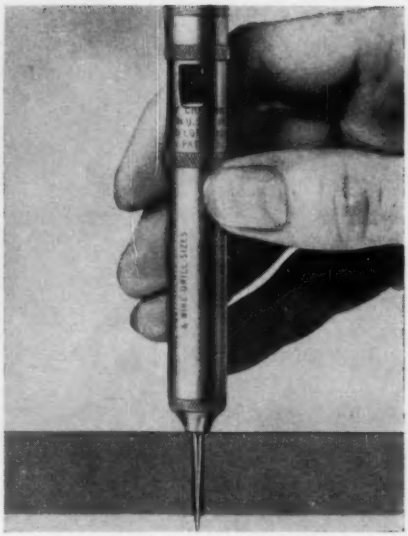
Six standard models with or without extension tubes, straight or angle sockets and a variety of base fittings are available. Write for folder No. 85 showing complete line.

Vimcolights are UL listed

VIMCO MFG. CO., Inc.

Since 1919

109 Brayton St. Buffalo 13, N. Y.



prevents changes in torque settings due to friction and heat.

The driver may be preset to release when machining torque approaches the strength limits of the tap under required operating conditions. Results to date reportedly show increases in tap life as high as 500% on some jobs.

Use ACTION Card, opposite page 64. Encircle No. 6

Gages made from granite of Rockwell hardness 71-72

B. A. Taylor Co., Dept. B, 16918 W. Seven Mile Rd., Detroit 35, Mich., has announced that cylindrical plug gages, ring gages, master discs, gage blocks, and anvils for comparators can be manufactured according to blue prints with granite whose hardness is 71 to 72 Rockwell scale, claimed to be very dense and close grained.

Plug gages are made with steel inserts. Ring gages are encased in steel to hold the granite in position. Plugs and rings can be made to X and XX tolerances.

Use ACTION Card, opposite page 64. Encircle No. 7

CUSHMAN

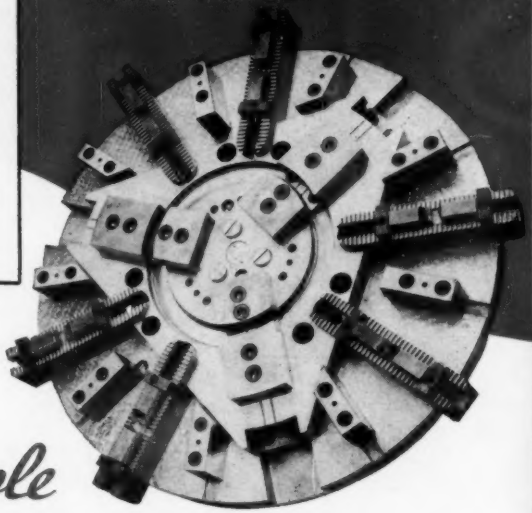
gives you CHUCK-ABILITY

CHUCK-ABILITY:

The ability to SPEED your work . . . ELIMINATE fatigue . . . IMPROVE your products . . . and REDUCE your costs . . . through design and selection of the right work-holding devices.

Remember-

You can't machine it right unless you hold it right



an example

. . . of this is the series of special chucks engineered and designed to hold jet engine discs and rings while being machined to exceedingly close tolerances. These jet engine parts, vital to our country's air arm, presented a major work-holding problem because of their large size and extremely small cross section. Until Cushman developed these special chucks, most forms of work-holding devices caused severe distortion difficulties. Design and engineering service such as this is always available to industry through the Cushman Engineering Department. Find out what Chuck-Ability can do for you . . . write Cushman for Special Data Book No. 852 describing Cushman Wheel and Ring Chucks.

THE CUSHMAN CHUCK COMPANY

806 Windsor Street **Hartford 2, Connecticut, U.S.A.**

CUSHMAN the CHUCKMAN CHUCKS

A WORLD STANDARD FOR PRECISION

Manufacturers of

Air Operated Chucks, Cylinders, and Accessory Equipment . . . The Cushman Power Wrench . . . Cushman Manually Operated Chucks and Face Plate Jaws.

Ask your Industrial Distributor

1C294D

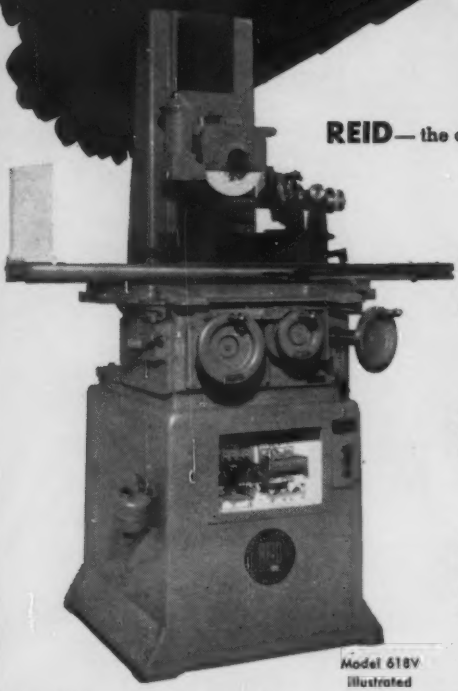
CAN YOUR SURFACE GRINDERS MEET TODAY'S DEMANDS?

Many over-age surface grinders now being used simply cannot measure up to the precision tooling needs of modern, efficient plants.
If you're operating one of these over-age grinders it's time you changed grinders.

PLAN NOW FOR REPLACEMENT

with REID GRINDERS

REID— the choice of industry for precision grinding



Model 618V illustrated

EASIER OPERATION

. . . finger-tip level controls eliminate stretching and bending, lessen operator fatigue. And, electrical controls are fully visible, yet protected behind a transparent shatter-proof panel.

BETTER SURFACE FINISHES

. . . hand scraped ways for smooth running; a motorized spindle turning on pre-loaded bearings, to eliminate wheel chatter, produce ground pieces with visibly finer surface finish.

RUGGED DESIGN

. . . all mechanical units built around rugged one-piece column casting to insure permanent alignment of cross-slide saddleways and vertical headways. Column is mounted on heavy cast iron base for maximum rigidity and freedom from vibration.

ECONOMICAL

. . . in both *initial cost*, and continued, trouble-free operation, Reid grinders are quality engineered throughout to provide accuracy and dependability.

CAPACITY

. . . 6" x 18" x 17¼" (from center of spindle to worktable). Choice of four models: either hand feed table, or power feed table with speed variable from 12 to 35 feet per minute. Complete accessories for wet or dry grinding and special operations are available.

Be ready for today's competition and a profitable future —

with **REID GRINDERS**

Encircle No. 186

see our catalog in MACHINE TOOL CATALOGS or write for copy

Please request Catalog 618-6

Reid Brothers Company, Inc.

BEVERLY, MASSACHUSETTS

DEPENDABLE

HARTFORD SUPER-SPACERS

THE HARTFORD SPECIAL MACHINERY CO. HARTFORD 12, CONN.

"We used to average 2 pieces per hour from 2 machines with 2 operators. We now get 10 pieces from 1 machine and 1 operator."

(Part is $3\frac{15}{16}$" diam. x $3\frac{1}{4}$" long)

(User's Name on Request)

SUCH 5 TO 1 PRODUCTION GAINS ARE AVERAGE WITH THE NEW

MODEL M Acme-Gridley BAR TYPE Fully Automatic Turret Lathes

and . . . we can show you where and how other customers are getting up to 10 times their former output. One main advantage of this machine is that it provides *automatic control of the cycle time for every job*—the complete machining of every piece is at the same predetermined rate at the end of a shift as at the start. This means faster and more accurately scheduled production. And, additional operations can be put on this machine to more nearly complete the piece without rehandling—eliminate the extra man-hours and release both labor and machines for other needs.

If this is important to your shop, have your engineers ask ours to submit guaranteed figures on your particular single spindle work.

Remember . . . You can't do **TODAY'S** job . . . with **YESTERDAY'S** tools . . . and make a profit **TOMORROW.**

The NATIONAL ACME COMPANY

177 EAST 131st STREET • CLEVELAND 8, OHIO

ACME-GRIDLEY BAR and CHUCKING AUTOMATICS

1-4-6 and 8 Spindle • Hydraulic Thread Rolling Machines • Automatic Threading Dies and Taps • Limit, Motor Starter and Control Station Switches • Solenoids • Contract Manufacturing

Toolmaster milling machine made in three styles

The Cincinnati Milling Machine Co., Dept. BB, Cincinnati 9, Ohio, has announced the Toolmaster milling machine, available in three styles: 1A, manual feed to quill; 1B, power feed to quill; and 1C, heavy duty head. Standard ranges: 16" longitudinal, 10" across and 17" vertical.

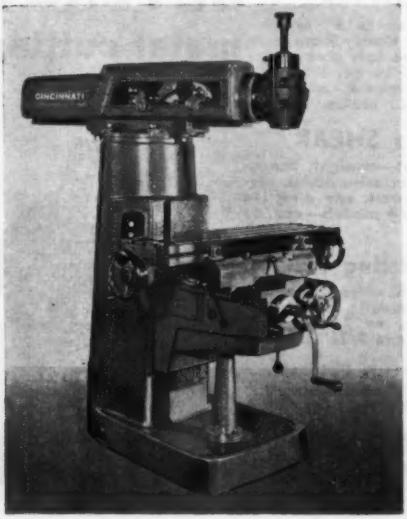
A number of innovations are incorporated in the machines. The overarm is mounted in dovetail ways in the turret unit. This construction permits the operator to swivel and position the overarm for complete coverage of the table with the spindle head. Square gibbed saddle-knee bearing, patterned after larger Cincinnati milling machines, is a prominent factor in ruggedness of the Toolmaster. The knee has a solid top and an ample recess in front of the column face where chips can fall to the base of the machine.

The knee bearing on the column is a departure from conventional design. Instead of a "wrap around" bearing surface on the dovetail guide, the knee takes its bearing in the two V surfaces formed between the dovetail guide and column face. This construction offers several times more resistance to deflection than the dovetail guide alone. The saddle is more than half the table length.

An anti-backlash device on the table feed screw consists of a double nut arrangement, one threaded to the other. Two screws may readily be loosened for backlash adjustment.

Motors for styles 1A and 1B are the "pancake" type, integral with the spindle head. There are eight spindle speeds, selected by changing one or two belts. The buyer has a choice of three ranges for 1A and 1B machines: 108 to 2825, 140 to 3800 or 215 to 5650 rpm. Machines having the low range

Cincinnati Toolmaster milling machine 1B with power feed to quill.

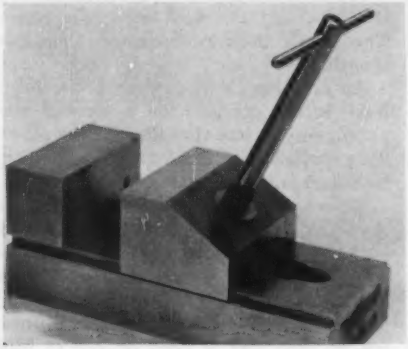


Toolmaster 1C with heavy duty spindle head.

are powered by ¾ hp motors, while machines within the medium and high ranges are powered by 1 hp motors. No. 1C machines have a 2 hp motor built into the overarm, and eight speeds selected by levers through sliding gears, ranging from 100 to 1530 rpm.

Use ACTION Card, opposite page 64. Encircle No. 8

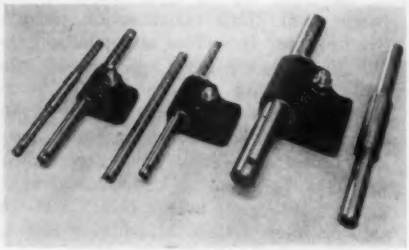
Toolmakers' vise, boring bar holders



Tool Specialties Co., Dept. B, 390 Hillside Ave., Hillside, N. J., has announced two new products, a toolmakers' vise, and a boring bar holder.

Vise has a capacity of 2½" wide, by 2⅞" long, by 1¼" deep. Over-all length is 6", height, 2¼", and weight, 5½ lb. Accuracy of .0002" over 6" is claimed.

The movable jaw is guided in recessed ways; jaw may be moved rapidly by tilting the wrench upward. The jaw is dropped into the nearest ratchet, and



Save Time . . . Labor . . . Materials with

BEVERLY metal cutting SHEARS

Inside SLOTTER

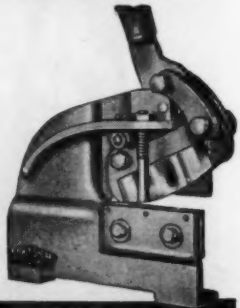
Makes cuts up to 8" inside edge of sheet. Sharp, clean burr-free cuts always assured. Cap. 16 ga. High strength aluminum alloy body; H.C.H.C. blades.

Throatless SHEAR

Make any cut—straight, irregular, curved. Exclusive design permits turning work any direction while cutting. 4 models—cap. to 3/16".

Slitting SHEAR

New "SS" Series—easier cutting with compounded linkage. 3 models — cap. to 3/16"; trimming capacity to 5/16" mild.

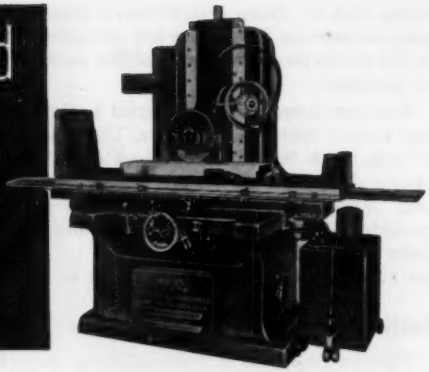


See your Beverly Distributor.
Write for FREE illustrated Bulletin.

Beverly SHEAR MFG. CO.

3005 W. 111th STREET • CHICAGO 43, ILLINOIS

When the need is for SPEED and PRECISION



You need a GRAND RAPIDS GRINDER

Here is extra value, extra accuracy, extra high-speed performance. Every Grand Rapids Hydraulic Feed Surface Grinder has a one-piece column and base for vibrationless rigidity and permanent alignment between cross travel ways and upright headways. Both longitudinal table travel and cross feed are hydraulically operated. On the larger machine the wheel head is powered for rapid vertical travel. ***The model 55 has longitudinal table speed of 125 fpm.!*** All parts are machined to micrometric tolerances and precision assembled for perfect freedom of action and entire elimination of play. That's why 6 out of 10 of these machines are sold to firms already using Gallmeyer and Livingston grinding machinery.

- **Send For Full Facts Today!**

We'll answer within 24 hours

GALLMEYER & LIVINGSTON

GALLMEYER & LIVINGSTON CO.
405 Straight Ave., Grand Rapids, Mich.

Please send the following literature without obligation:

- ☐ Grand Rapids Surface Grinder Catalog
- ☐ Grand Rapids Universal Cutter and Tool Grinder Catalog

NAME _____

POSITION _____

FIRM _____

FIRM ADDRESS _____

when locked, gives a downward gripping movement. Two holes are provided in the stationary jaw for mounting stops or parallels.

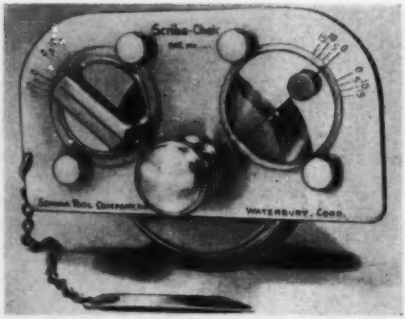
The new heavy duty universal boring bar holder features two bars, 1½" and 2" dia., with ⅝ holes broached square at one end and at 45° angle on opposite end. With the smaller bar, a sleeve is provided. Holder is suitable for lathes from 22" to 30" swing.

Use ACTION Card, opposite page 64. Encircle No. 9

Cutting edge gage

The Scribe-Chek is a simple, accurate method for sharpening circular form tools. The exact cutting edge required is scribed on the tool (with or without top rake) then operator visually checks the result after sharpening.

Gage is of stainless steel and rustproof construction throughout. Somma Tool Co., Inc., 21 Brown St., Waterbury, Conn.



Use ACTION Card, opposite page 64. Encircle No. 74

Gage takes place of several tools

Claimed to be a "tool kit in itself," the Fuller Gage, product of the Fuller Gage Co., Dept. BB, 303 N. Bancroft St., Indianapolis, Ind., through simple changes can be used as the following gages: I.D., length, height, telescopic, planer, surface gage with micrometer. It can also do the work of small square and center head, divider, vertical scribe,

INDEXING TURNTABLES AND POSITIONERS

CAMS

Eisler makes over 100 different types of indexing mechanisms for spraying, glass insulators, melting and glass glazing with rotating stations and motorized or hand operated. Rotating tables of all kinds for over 35 years. We supply any part or complete equipment and we make special turntables and cams to your specifications. You are invited to see our showroom and see for yourself our many models on display. Write or call for our new catalog No. 88-55.

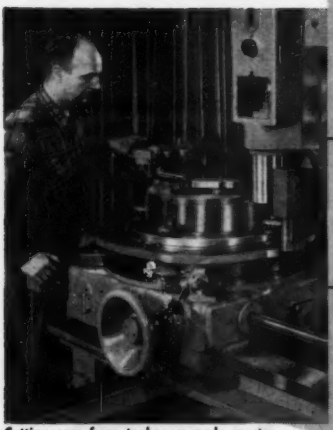
DR. CHAS. EISLER M. E., PRES.
EISLER ENGINEERING CO., INC., 762 So. 13th Street, Newark, N. J.

ROCKFORD *Hy-Draulic* SLOTTERS

equipped with

Kopy-Kat

duplicators



Cutting cam from tool-room-made master.

1. Tool Room Made Master

2. Functional Cam

3. Finished Die

Cutting new mold from functional cam.

Cut Dies Fast, Accurately, Economically

This manufacturer wished to duplicate blanking dies fast, accurately and inexpensively. A standard Hydraulic Slotter, equipped with a Kopy-Kat Duplicator, was used and this is how the job was done:

The tool-room-made master is placed on the Slotter. From it, the duplicator develops the functional cam. This cam is an enlarged projection of the die, in reverse, and is followed by the duplicator stylus in producing the finished dies. Sketches show the sequence of operations as performed.

Kopy-Kat equipped Hydraulic Slotters are readily adaptable to an almost endless variety of internal and external contour machining problems. A Rockford Machine Tool Co. representative can give you further details of the special advantages of the versatile Kopy-Kat Duplicator and how it may simplify your form machining work.

Hy-Draulic

ROCKFORD MACHINE TOOL CO.

2500 KISHWAUKEE STREET • ROCKFORD, ILLINOIS

trammel with micrometer.
Photograph shows the gage assembled

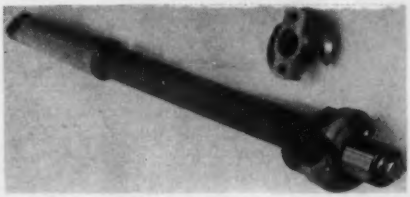
as a micrometer surface gage. There are two needles: a short and a long. A wide range in layout work is claimed when the long needle is used. Micrometer travel is 1".

Use ACTION Card, opposite page 64. Encircle No. 75

Drill and boring tool drills holes 1½" dia. and over

The Hardy drill and boring tool, Model AMV, product of Hardy Tool & Machine Div., Spectol Corp., Dept. B, 10 Bridge St., New York 4, N Y., claims small power consumption.

Holes 1½" dia. and over are cut and drilled to accurate dimensions, with a smooth finish. Tool is said to be made



MODERNIZE your tapping equipment NOW!

WITH PROCUNIER HIGH SPEED TAPPERS

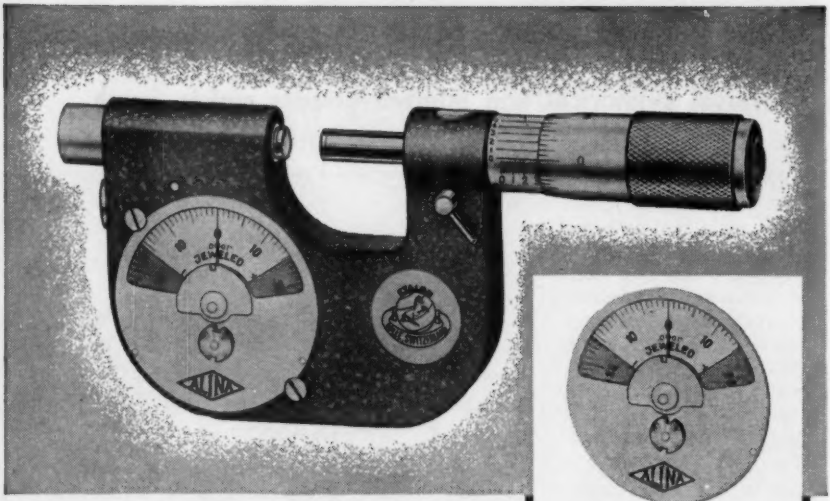
If you are now using ancient tapping equipment, you are needlessly increasing operating costs, seriously impairing production and adding to your maintenance expense. Out-of-date, over-used models are incapable of attaining the streamlined efficiency that modernized industry is demanding.

Industrial users who recognize the need for high speed, accuracy and efficiency, are insisting on Procunier Tappers to solve their steadily mounting production and spoilage costs. Procunier Tappers invariably produce more pieces per hour with fewer rejections, fewer spoiled pieces and a minimum of broken taps. Designed for today's tough production conditions, they incorporate many unique and exclusive construction and operating features. Best of all, they're made to "take it" and provide you with many more profitable "operating hours" and less costly down time interruption. And they're priced low enough to make it economically possible to modernize your tapping operation NOW!

New Exclusive "Tru-Grip" Tap Holder smaller, lighter, more accurate, taps close to walls.

Write for FREE Brochure giving full details and specifications on the complete line of Procunier tapping heads and accessories.

PROCUNIER Safety Chuck Co. 14 South Clinton Street Dept. I, Chicago 6, Illinois



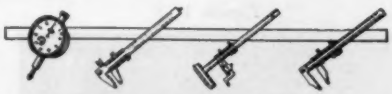
To simplify fine adjustment, the dial may be rotated as much as three graduations, on either side of zero. Built-in tolerance hands, individually adjustable: *blue* for undersize, *red* for oversize.

NEW! Etalon No. 25N Indicating Micrometer

ALWAYS REPEATS!

The Etalon No. 25N combines the precision of the dial indicator with the accuracy of the micrometer screw. It eliminates the chance of human error—"feel"—common to setting an ordinary micrometer . . . eliminates the need for "go and no-go" gauges, since you can set it to the required size, lock it and then gauge your parts. Retractable anvil permits quick and easy introduction of the part to be checked without danger of scratching. Load on the anvil retracting mechanism is adjustable; the mechanism can in no way influence reading. Etalon No. 25N may be used in the hand or mounted in a micrometer stand.

- *jewelled*
- *shock-proof*
- *variable anvil pressure*
- *carbide measuring faces*
- *dial and micrometer barrel graduated in .0001"*
- *one piece hardened stainless steel screw*



Ask your dealer to show you the complete selection of ETALON instruments or write

ETALON
ACCURACY

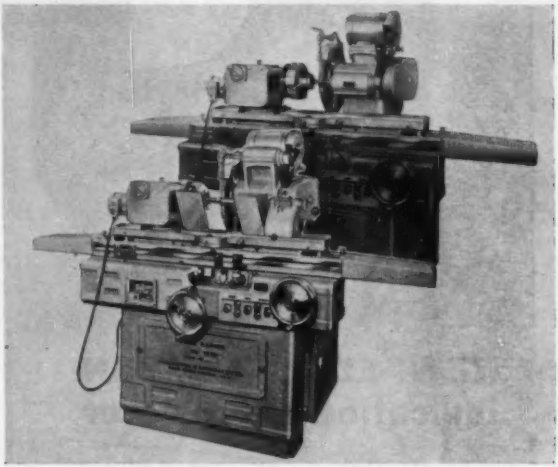
ALINA CORPORATION
401 Broadway, New York 13, N. Y.

of best grade high speed steel, which requires less regrinding time. Standard holders are fitted with Morse taper shanks, No. 4 to No. 6.

Use ACTION Card, opposite page 64. Encircle No. 76

Universal cylindrical and internal grinder makes rough cuts, fine finishes

Designed primarily for plants having to do a wide variety of external and internal grinding but not enough of each to require the purchase of specialized machines for each kind of work, Gallmeyer & Livingston's No. 1230 was built specifically for cylindrical and internal grinding.



It is capable of making rough cuts as well as producing fine finish. The convenience of its controls and adjustments eases handling.

The work carrying table is mounted directly on fixed base ways, without an intervening cross traveling saddle, thus allowing the operator to stand up close to the work .

The table can be hydraulically operated at speeds from 3" per minute to 50' per minute with infinite variation within that range. The hydraulic system is of the closed circuit, exhaust control type. Gallmeyer & Livingston Co., Dept. BB, 405 Straight St., Grand Rapids, Mich.

Use ACTION Card, opposite page 64. Encircle No. 77

Hydraulic grinding fixture eliminates several operations

Scram, automatically operated hydraulic grinding fixture, operates opposite usual procedure of swivelling regulating wheel so it will feed the

Figure 1

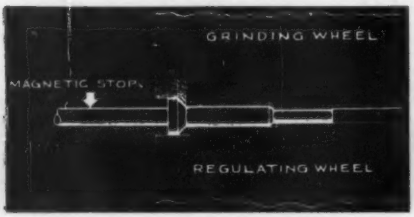
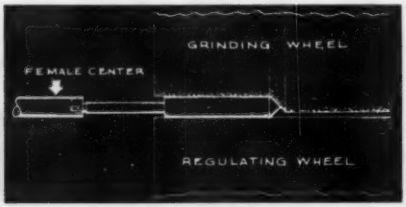
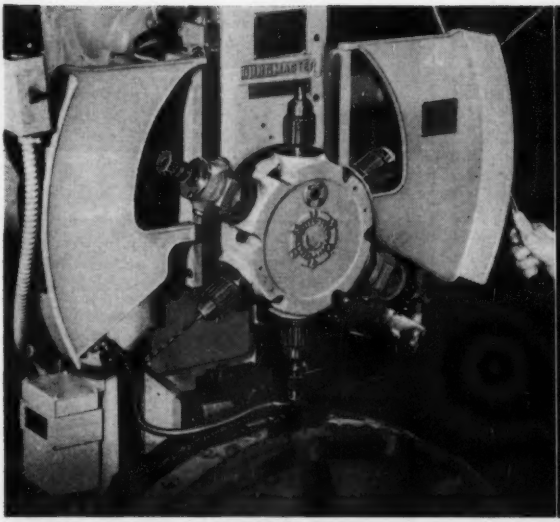


Figure 2





BURGMASTER TURRET DRILLS

with POWER INDEXING

Reduce tool changing and set-up time, maintain high quality . . .

REPORT FROM:

SOLAR AIRCRAFT COMPANY

San Diego, Calif.

The BURGMASTER Turret Drills at Solar Aircraft Company's San Diego plant provide versatility with a minimum of tool changing and set-up time. Used in the production of high alloy "hot" parts for jet aircraft engines, the six spindle units have effected valuable savings in time and money without sacrificing the high quality so vital in components for the powerful jet engines in use today.

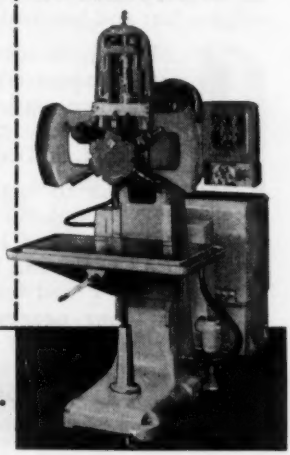
Pre-setting features permit correlation of related operations, thus reducing scrap and minimizing the error factor. Pre-selective speed control on each individual spindle gives all required r.p.m. for various size drills.

The BURGMASTER Turret Drill holds to close tolerances so common in the aircraft industry. On one countersink, drill and tap operation on a jet engine part, tolerances run .0002 for hole location and .003 for squareness.

Write for Bulletin No. BB1

This versatile BURGMASTER is modified by removing table and substituting index fixture, pointing up the ability to handle large or small work pieces.

Available in 6 spindle manual; 6 and 8 spindle, hydraulic, automatic models. All BURGMASTERS feature power indexing, pre-selective spindle speeds, very close pre-selective depth control.



BURG TOOL
MANUFACTURING COMPANY INC.

P.O. BOX 48, GARDENA STA., GARDENA, CALIF.

Wear resistance, toughness, red hardness — du Mont Bits put all three together. One quality isn't built up at the expense of another. That's why du Mont Bits *do more* — give you more cuts per bit and per dollar — keep their keen cutting edge — last and last and LAST!

Make your own tests of comparative performance and you'll standardize on du Mont H. S. Tool Bits.

Ask us to mail you FREE Tool Bit COMPARISON CHART, CATALOG and PRICE LIST T and the name of your nearest Distributor.

The du MONT Corporation
Greenfield, Massachusetts

Figure 3

Figure 4

work in, tight against an end stop. New method swivels the regulating wheel so it will feed the work out or towards the center or magnetic stop in the fixture, and the table of the fixture feeds against the work with an infeed movement, which automatically keeps the workpiece turning on a fixed center, or against a magnetic stop, which automatically pulls the workpiece back with the backward movement of the table.

Multi-diameter workpieces with fixed angles and lengths can be ground simultaneously in one operation and with the production of a centerless grinder at a saving in grinding cost, it is claimed. See Figure 1.

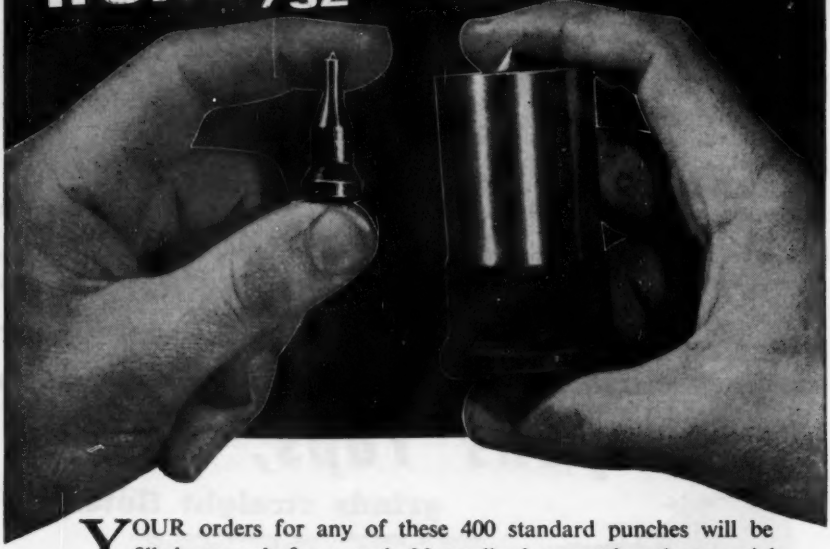
In grinding of small pieces with male centers it is possible to grind the outside diameter and the center at the same time, insuring concentricity. See Figure 2.

Taper shank tools can be ground concentric in a centerless grinder with this double table fixture, as shown in Figure 3.

Two piece parts can be ground simultaneously, one on each side of the wheel. See Figure 4. Modern Devices, Box 429-BB, Libertyville, Ill.

Use ACTION Card, opposite page 64. Encircle No. 78

400 Standard Cleveland Punches from 5/32" to 1 1/2"



YOUR orders for any of these 400 standard punches will be filled promptly from stock. Naturally they cost less than special punches. What's more, when you order Cleveland punches you're sure of getting quality tools backed by years of specialized experience. We're constantly experimenting with various steels and processes so that we can give you the very best.

Are your punching machines equipped to use standard Cleveland punches? If not, it will pay you to investigate the many advantages of standardization. AA-095

1880 75 1955
YEARS OF MACHINE TOOL PROGRESS
Diamond Anniversary

THE CLEVELAND PUNCH & SHEAR WORKS CO.
Established 1880

POWER PRESSES — FABRICATING TOOLS

City Foundry Division • Small Tool Department
E. 40th & St. Clair Avenue • Cleveland 14, Ohio

NEW YORK • CHICAGO • DETROIT • PHILADELPHIA • E. LANSING • OXFORD, O

Hand truck climbs stairs

A new stair climbing hand truck, the Stair Cart, which is said to safely double the load a man can roll up steps and treble the load he can move down stairs or ramps has been announced by Valley Craft Products, Inc., Dept. BB, 750 Jefferson Ave., Lake City, Minn. It is equipped with a special ratchet mechanism which enables it to roll up stairs step by step as the operator pulls a cable drive.

The two-wheel safety brakes allow control at all times. Units are especially practical for handling such materials as welding tanks, barrels, drums, castings, hardware, machinery and related items.

Features such as interchangeable shoes, sealed ball bearings and steel tube construction are said to assure load flexibility. Large pneumatic tires add to ease of operation and eliminate marking of steps. Six different models are available for handling various sizes of loads including a special barrel cart and a complete welding cart.

Use ACTION Card, opposite page 64. Encircle No. 79

Sharpens Taps, Saws

grinds straight flutes

A versatile straight flute grinder that will:

a) Sharpen taps
b) Sharpen Saws in Gangs
c) Sharpen Reamers
d) Grinds straight flutes from solid
e) Spiral points
f) Sharpen milling cutters, Woodruff key cutters

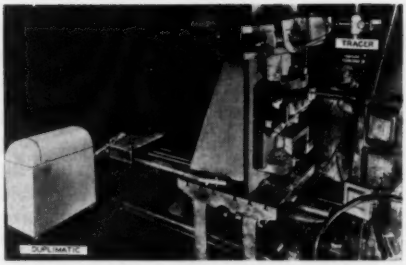
Automatically indexes, no special skill needed!

Write for bulletin on 50F Automatic Universal Flute Grinder

WARDWELL MANUFACTURING CO.
3807 Ridge Rd., Cleveland 9, Ohio

Maker of Largest Line of Saw and Tool Sharpening Machines

Contour machining duplicator improved



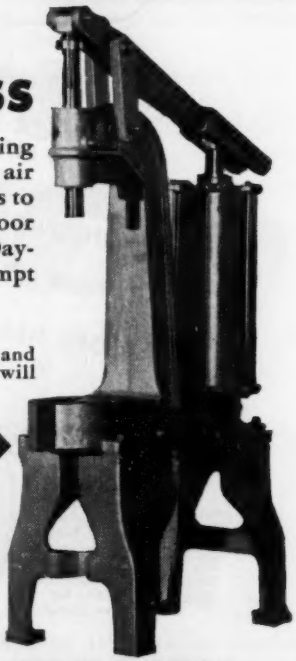
Tracer Control Co., Dept. BB, 595 E. 10 Mile Rd., Hazel Park, Mich., has announced several improvements in the Duplimatic contour machining duplicator, claimed to make it completely flexible.

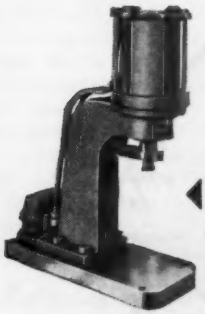
Setup and dismounting can now be accomplished in a shorter time. When

SAVE!

WITH A HANNIFIN AIR PRESS

It's the ideal press for that occasional pressing job. These presses operate off ordinary shop air supply. They're fast and safe. Over 30 models to choose from...many for either bench or floor mounting. Capacities from ½ to 18 tons. Daylight to 46 inches...reach to 12 inches. Prompt delivery.





WRITE. Complete information and prices on Hannifin Air Presses will be sent on request.

6 Tons (Model B-2) One of more than 30 models. Press with base, $554.

1-ton Hand-D-Press. For small parts manufacturers. Press, $232.

Prices F.O.B. our press plant, St. Marys, Ohio, subject to change without notice.

HANNIFIN

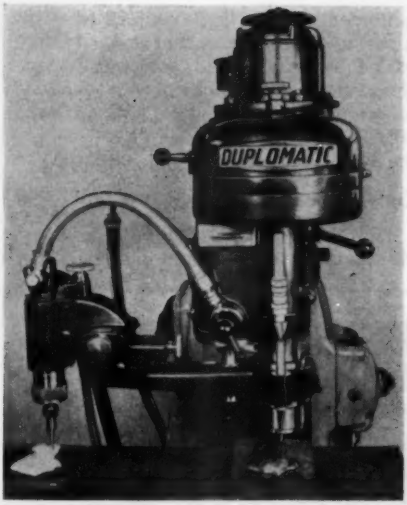
HANNIFIN CORPORATION, 529 S. WOLF ROAD, DES PLAINES, ILLINOIS

connected the device does not interfere with conventional use of the machine. By pushing the "stop" button the Duplimatic automatically disengages and supplementary operations can be performed or another job run in without tearing down the setup. It engages again with the "start" button. Units are available in three models for controlling one, two or three feeds.

Use ACTION Card, opposite page 64. Encircle No. 52

Automatic milling of complex contours with hydraulic copying attachment

Automatic milling of three dimensional complex contours in dies, patterns, molds or other production is now possible on up to No. 3 standard milling machines by use of the new Duplomatic hydraulic copying and tracing attachment. The supersensitive copying stylus can easily and rapidly follow a three dimensional master pat-



tern of plaster, it is claimed.

Production time on intricate patterns has reportedly been reduced by as much as eighty per cent by using this automatic equipment. Once the machine is set up, loading and unloading the work are all that is required.

The stylus, which has a micrometer adjustment, can follow up to 90° in a one to one ratio. Eight geared spindle speeds ranging from 290 to 3250 rpm can be utilized from the independently driven spindle motor. The hydraulic power unit is also independently driven. Independent operation between tracing and feed units can be maintained or they can be automatically synchronized with the table and cutter movement. The machine is sold exclusively by S & S Machinery Co., 133 53rd St., Brooklyn, N.Y.

Use ACTION Card, opposite page 64. Encircle No. 53

Self-aligning reamer holder

An improved self-aligning reamer holder has a free-floating positive drive that is claimed to maintain the axis of the reamer always parallel to the centerline of the hole. This parallel

(Advertisement)

New Method Makes Higher Quality Marking Devices

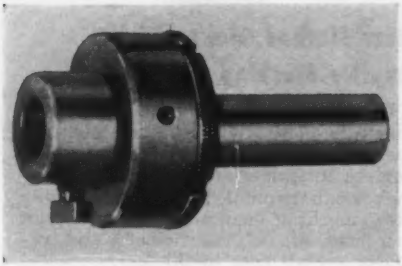
Use of highest quality tool steel and carefully controlled heat treatment in the production of all types of marking devices including steel stamps, inspector's code symbol stamps, embossing dies, marking hammers and roll dies increases life of the devices and reduces overall cost to the user.

The complete line of these steel marking devices is described in Catalog NM-51, available on company letterhead from New Method Steel Stamps, Inc., 147 Jos. Campau, Detroit 7, Michigan. Also described and illustrated are type holders and interchangeable type, automatic roll markers for screw machines, logotypes, etc.

New Method Steel Stamps also maintains complete facilities for production marking, precision engraving and profiling.

marking devices
steel stamps . . . . . pp. 6 and 7
type holders . . . . . pp. 2 and 3
automatic roll markers . p. 4
roll dies . . . . . p. 5
solid stamps . . . . . p. 5
embossing dies . . . . p. 5
logotypes . . . . . p. 5
marking hammers . . . p. 5
production marking . . p. 8
precision engraving . . p. 8
profiling . . . . . p. 8
NEW METHOD STEEL STAMPS, INC

Free 12 page illustrated catalog describes complete line of marking devices and facilities for production marking, precision engraving and profiling. Available on company letterhead from New Method Steel Stamps, Inc., 147 Jos. Campau, Detroit 7, Michigan.

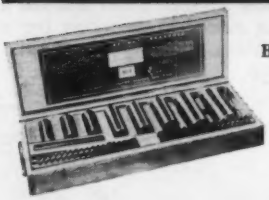


alignment feature is accomplished with a spring arrangement that is easily adjusted for tension to compensate for the overhanging weight of various sizes of reamers. Marcellus Mfg. Co., Dept. BB, Belvidere, Ill.

Use ACTION Card, opposite page 64. Encircle No. 54

Carbide boring bars

The Nelco Tool Co., Pine St., Manchester, Conn., has announced a line



With a du Mont *Minute Man* Keyway Broach Kit you can cut a keyway in one minute for as little as a penny apiece. Gears, cutters, pulley hubs, collars, couplings — any bore from ¼" to 3" — any width keyway from 1/16" to 1". Try one — unless you're against saving money!

Now,

GET THIS FOR SQUARE HOLES

Minute Man High Speed Steel Square Broaches finish cast or drilled holes in one pass. *In stock* at your Industrial Distributor's for 1/16" to ¾" squares. Low in cost.

SEE 'EM DEMONSTRATED — Booth No. 496
PLANT MAINTENANCE SHOW — CHICAGO

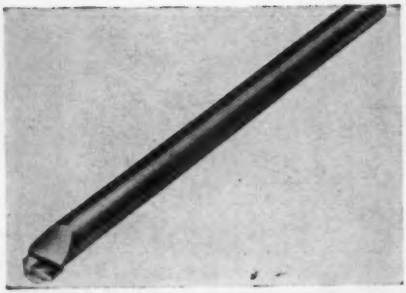
FOR FREE INFO clip and mail to

The du MONT CORPORATION, Greenfield, Mass.
Send BROACH CATALOG and PRICE LIST T to

Name.....

Company.....

Address.....



of carbide boring bars featuring hardened and ground shanks, slash milled design and nickel shim sandwich braze which is claimed to eliminate tip fracture due to brazing strains. Carbide tip overhang prevents grinding or snagging of steel when resharpening the tool.

Use ACTION Card, opposite page 64. Encircle No. 55

Package power units

Custom built package power units for operating pressures from 250 to 2000

BRAND NEW

VERTICAL-HORIZONTAL-BASE

DE-STA-CO TOGGLE CLAMP

with low silhouette
the fixture-hugger that makes it far easier to insert and remove work . . .

and complete clearance
of working area due to flop-over holding bar—ideal for positioning metal or plastic sheets!

Send for FREE CATALOG
on the new DE-STA-CO Models 507 and 509

DE-STA-CO DETROIT STAMPING COMPANY

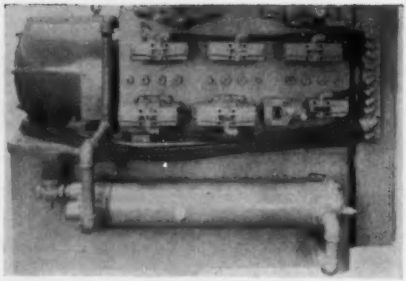
World's FIRST Line of TOGGLE CLAMPS

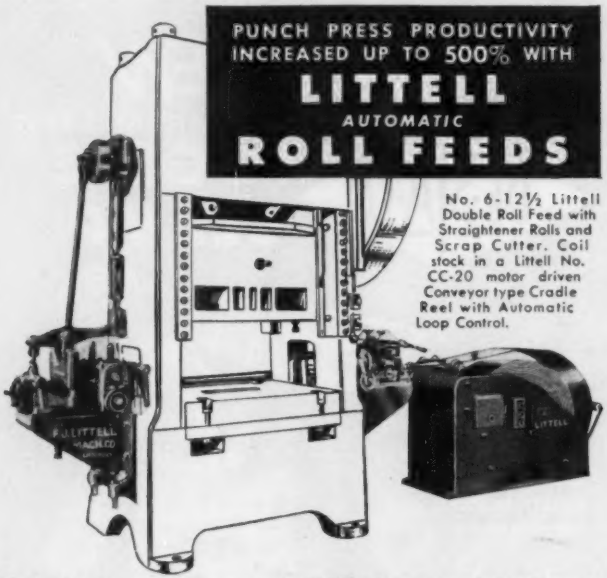
347 Midland Avenue • Detroit 3, Michigan

psi, product of Turchan Follower Machine Co., Dept. B, 8295 Livernois, Detroit 4, Mich., include all necessary motors, pumps, controls, valves, piping, oil reservoir. Essential hydraulic accessories such as oil level gages, filter, cleaners, fittings, etc., are also contained in the units.

The compact, simplified design is claimed to substantially reduce installation and maintenance costs.

Use ACTION Card, opposite page 64. Encircle No. 56





PUNCH PRESS PRODUCTIVITY INCREASED UP TO 500% WITH

LITTELL AUTOMATIC ROLL FEEDS

No. 6-12½ Littell Double Roll Feed with Straightener Rolls and Scrap Cutter. Coil stock in a Littell No. CC-20 motor driven Conveyor type Cradle Reel with Automatic Loop Control.

Production per press increases up to 500% when automatic feeding with Littell Roll Feeds replaces hand feeding. The savings in handling and storage of coil stock added to the economies of faster production produce an automation dividend. Littell Roll Feeds in a wide range of sizes and models handle stock up to .156" maximum thickness and up to 72" maximum width at speeds of 50 to 250 strokes per minute. Lengths fed per stroke range up to 50". Standard Littell Automatic Feeds serve all types and sizes of presses. *WRITE FOR THE LITTELL ROLL FEED CATALOG*

F. J. LITTELL MACHINE CO.

Speed with Safety

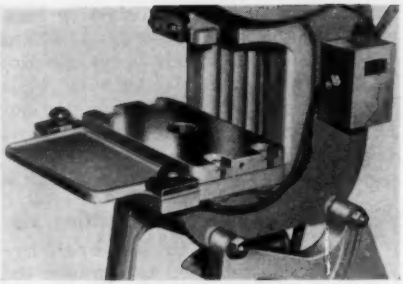
ROLL FEEDS • DIAL FEEDS
STRAIGHTENING MACHINES
REELS • AIR BLAST VALVES
District Offices: Detroit, Cleveland

4147 N. RAVENSWOOD AVE., CHICAGO 13, ILL.

Two-hand control for punch presses

Searjeant Metal Products Inc., 83 Pittsford Rd., Mendon, N.Y., have announced the addition of a two-hand electro-solenoid control to their line of punch press safety equipment. It is made in several sizes.

The press operator must push two mushroom type buttons in order to trip the press. Both buttons must also be released to trip the press again. This



Swanson TURRET INDEXING UNITS

Provide a basic chassis to save time and cost in designing and building special automatic machines for a wide variety of manufacturing operations.

VERSATILE
ACCURATE
RUGGED

These complete* ready-made units are available on short delivery to help solve your automation problems NOW.

*furnished with drive and motor

STANDARD UNITS:
20" — 30" — 40" Turret dia.
6 — 8 — 16 — 24 — 32 work stations.
1 to 4700 indexes per hour.

• Write for bulletin TMB •

ENGINEERS and BUILDERS of SPECIAL AUTOMATIC MACHINES

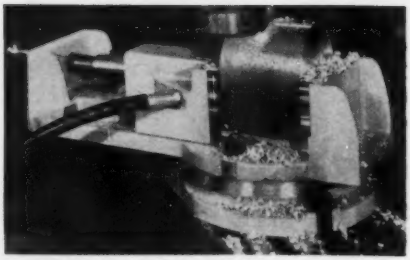
SWANSON
TOOL & MACHINE PRODUCTS INC., ERIE, PA.

safety feature is accomplished by back contacts on the push buttons and means that both hands of the press operator must be out of the danger zone while the press is set in motion. The operator cannot hold or tie down one button and trip the press with the other.

Use ACTION Card, opposite page 64. Encircle No. 57

Air powered hydraulic machine vise

WiltOmatic M-M air powered hydraulic vise is claimed to combine the



speed of an air vise with the strength,

This Base makes a hit with every dial gage user. It puts the indicator right where you want it, and keeps it there. Permanent Alnico magnet has powerful 50 lb. grip *on all four sides.*

Save set-up time and increase work accuracy with this super-flexible, super-convenient Magnetic Base.

Clip this Coupon

The du MONT CORPORATION, Greenfield, Mass.

Please mail Catalog and Price List T on the Minute Man Magnetic Base with new Universal Joint.

Name.....

Company.....

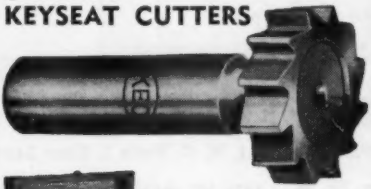
Address.....

KEO

CENTER DRILLS

Made of finest high speed steel. Available in all standard sizes. Always in stock for *immediate delivery*. Specials made to your specifications.

KEYSEAT CUTTERS



High speed. Right hand ½" shank. Diameter from ¼" to 1½". Standard sizes in stock for immediate delivery. Complete set—41 sizes—available in sturdy, hardwood box. Saves time and money, because you always have the size you need.

CENTER REAMERS

High speed steel. Reamers from ¼" to 1" regularly furnished with 60°, 82°, 90° included angle. Specials made for your specifications.

LATHE MANDRELS

Precision made of tool steel, hardened and accurately ground. Tapered .0005" to the inch. Mandrels from 8/16" to 1" are .0005" undersize at small end, from 1" to 3", .001" undersize. Immediate delivery.

Write for Literature

Illustrated literature and prices on all KEO Products mailed on request.

KEO CUTTERS

19326 Woodward · Detroit 3 Mich.

SUPEREAM

No. 700

THE ONLY DECIMAL REAMER

with all FLUTES ground Face and Back After Heat Treatment...

No. 720

PREVENTING

CLOGGING or FREEZING of CHIPS for REMARKABLE

SMOOTH REAMING

▼ All diameters are held to plus .0002 and minus .000 for close sizing. Size markings are stamped half-way up on shanks so they cannot be obliterated by drill press chucks.

No. 730

▼ **ROSE CHUCKING REAMERS** Available in the above four styles on request. Designate by "R" in front of style desired.

No. 740

* *In Emergency PHONE Libertyville 2-4200.*

No. 700 Straight Flute	**No. 730 30° Left Hand Spiral**
No. 720 7° Left Hand Spiral	**No. 740 7° Right Hand Spiral**

TWENTIETH CENTURY MANUFACTURING CO.

ROUTE 176 and BRADLEY ROAD BOX 429B, LIBERTYVILLE, ILL.

compactness, and locking force of a hydraulic vise. It will reportedly eliminate special production tooling when used as an automatic holding fixture with specially formed jaws.

With the touch of a toe on an air valve, the operator can place a force of 9000 lb. on the jaws of the vise. Yet the tool is flexible, adjusts with ordinary crank handle motion to desired opening, and can be locked manually as well as under power. Wilton Tool Mfg. Co. Inc., Dept. B, 925 Wrightwood Ave., Chicago 14, Ill.

Use ACTION Card, opposite page 64. Encircle No. 58

New home for A.I.T.

The A.I.T. Diamond Tool Co. has moved to a new plant in Skokie, Ill., said to be the latest in modern engineering. The company anticipates an increase in production schedules as a result of the move.

VARIABLE SPEED DRIVE...

now STANDARD EQUIPMENT on ALL W. F. Wells & Sons Saws

Provides speeds from 50 to 290 f.p.m. Combined with a graduated metering valve on our fully hydraulic models, this feature permits choice of proper blade speed and pressure for maximum production and blade life from high speed or high carbon steel blades.

2 new models with full hydraulic operation—MODELS W and F

MODELS W and F—9"x18" and 14"x18" capacity, respectively, feature full hydraulic operation. All welded steel base—more rigid for heavier cutting. Welded, one-piece cutting head for swifter blade changes and easier chip removal. Larger capacity coolant and chip tray. Automatic bar feed available to reduce operator's time to a minimum.

AUTOMATIC BAR FEEDS ARE AVAILABLE FOR BOTH MODELS

MODEL H—the economy, hinge-type model in our line. 9" x 16" capacity. One-piece welded frame lowers hydraulically. Pressure easily adjusted for proper cutting. Special precision guides give longer blade life.

We also make . . .

- **Automatic bar feeds for duplicate cutting.**
- **Stock stands for positive alignment of stock.**
- **Coolant systems for wet cutting, and other accessories.**
- **Custom-built machines for special applications.**

W. F. WELLS & SONS

THREE RIVERS, MICH.

Heber L. Newell

The appointment of **Heber L. Newell** as assistant general manager has been announced by the Denison Engineering Company, Columbus, Ohio.

Dreis & Krump Mfg. Co., Chicago, has announced the election of **J. A. Schaefer** to the newly created post of executive vice-president.

Mrs. E. P. Wilkinson has tendered her resignation as president of the Logans-

J. A. Schaefer

CLARK

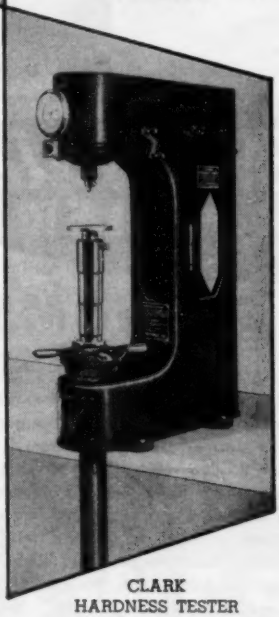
TOMORROW'S ACCURACY TODAY

THE MOST FOR YOUR "ROCKWELL TESTING" DOLLAR!

The Clark Hardness Tester is precision built to give guaranteed precision results. Thousands of Clarks, with years of service all over the world, attest to this.

The surprisingly low price includes the precision Clark Diamond Cone Penetrator, as well as Steel Ball Penetrators, a wide assortment of Anvils, Test Blocks, and other accessories. Available in two models, for Standard and Superficial "Rockwell" hardness testing, each with choice of 4", 8", 12", or 16" work capacity.

Before you invest in any hardness tester, get the facts about the low price, speedy delivery, and *guaranteed accuracy* of the Clark. Write today.



CLARK
HARDNESS TESTER

CLARK INSTRUMENT, INC.

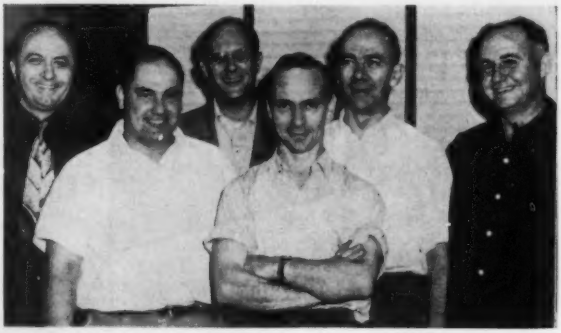
10206 FORD ROAD
DEARBORN, MICH., U.S.A.

Employees sponsor profit-sharing plan

The profit sharing plan of Pivot Punch and Die Corp., North Tonawanda, N.Y. is a departure from the usual arbitrary plan submitted by management. Here a committee of employees has formulated the plan, which was then agreed upon by the management.

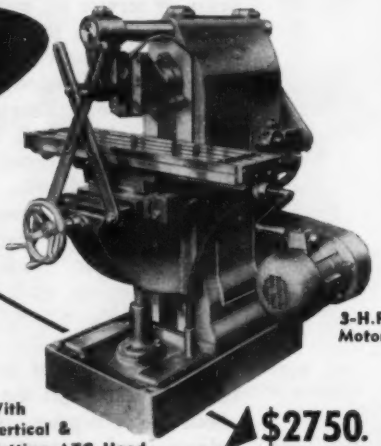
It is a frank and honest effort to prove that it is possible for management and employees to make additional profits under normal economic conditions through greater efficiency and teamwork. Management has agreed to equally share any additional profit with the employees.

The plan is characterized as strictly a business proposition, inasmuch as management is not being benevolent,



Profit sharing plan employee committee of Pivot Punch and Die Corp. Left to right, front row, Geya Syura, James Waggett. Back row, Paul Grace, James Shanahan, Chairman, Herbert Baker, George Mishko.

The Bradley MILLER for ECONOMY



3-H.P. Motor

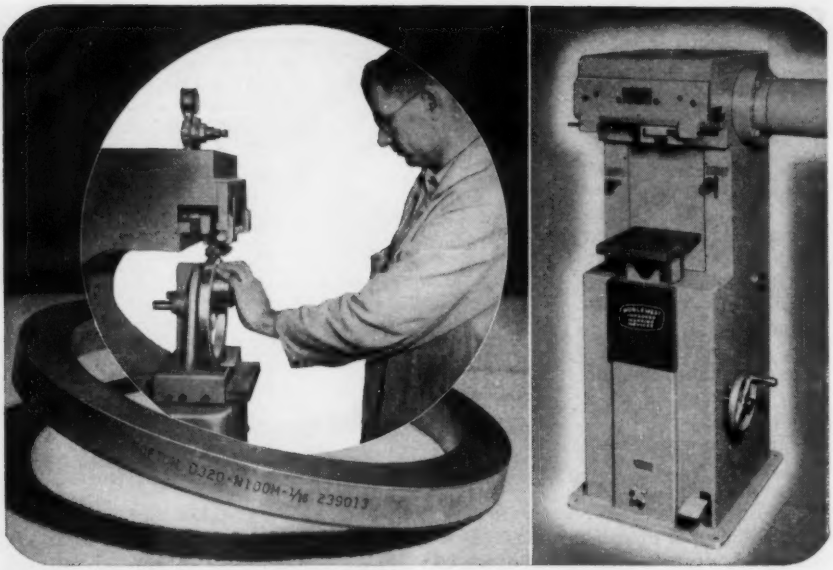
With Vertical & Slotting ATC Head

$2750. DELIVERED

Looking for a well built miller, designed for long life and precision work at a low price? Look no further . . . as the Bradley Miller has all these qualities. Equipped with a vertical head and slotting attachment. Working table surface area is 46" x 10". Automatic feed longitudinal, 36½". 10" vertical adjustment. Weighs 3,000 lbs. and occupies a 70" x 60" floor space. Further details mailed on request. Write today. No obligation.

Some Territory Open

BRADLEY MACHINERY COMPANY
211 JOS. CAMPAU AVE. DETROIT 7, MICH.



New Heavy Duty ROLL-O-MARK

Multi-Purpose Metal Marking Machine Features—

- ***Extra large work capacity***
- ***Greater versatility***
- ***Marks, numbers, graduates, embosses***
- ***Low operating cost***

Marking the surface of large diameter rings (shown above) is just one of many applications that are being done faster, better and at lower cost with the new heavy duty all-pneumatic Roll-O-Mark. This one machine can be tooled for marking round or flat surfaces . . . precision graduating . . serial numbering . . . knurling . . . and embossing. Noblewest makes the machines, marking dies, and work-holding fixtures for doing the complete job. And remember, Noblewest Roll-Marking is *permanent* marking—*good for the life of your product.* Write Noble & Westbrook Manufacturing Company, 9 Westbrook Street, East Hartford 8, Conn.

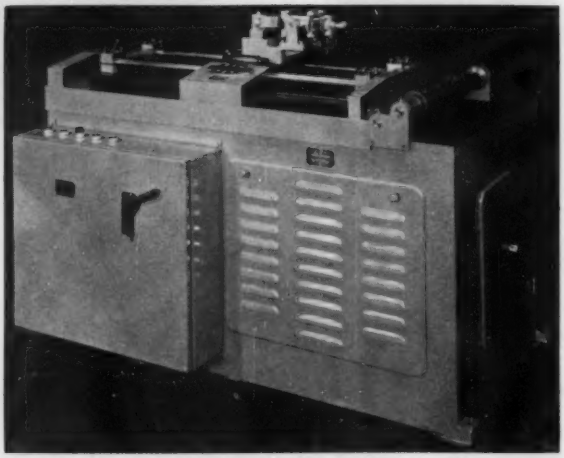
MARK IT BEST WITH

NOBLEWEST IMPROVED MARKING DEVICES

NOBLEWEST

ORIGINATORS OF THE ROLL MARKING PROCESS

Cabinet mounted, motor driven slide feed



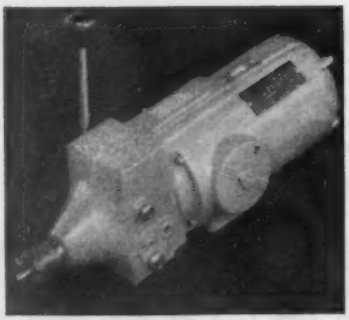
The capacity of Model No. SFC-24-24 cabinet mounted, motor driven slide feed is for material up to 24" wide and feeding length adjustable up to a maximum of 24" at one stroke. Feed lengths over 24" can be obtained by means of a counting unit.

Since this is an individually motor driven unit, there are no mechanical connections to the press, and the feed can be used with practically any type of press, it is claimed.

Features are: variable speed drive; electrically controlled air operated gripper mounted in feed block; electrically controlled air operated check; inching control for inching material into dies; manually operated push button for single tripping press. U. S. Tool Co., Inc., Dept. B, Ampere, N.J.

Use ACTION Card, opposite page 64. Encircle No. 42

"SUB ASSEMBLY BOTTLE NECK"



Illustrated above is a Model IM Fen Automatic Wrench, which has a maximum torque of 250" lbs. at a spindle speed of 60 rpm.

For detailed information regarding the application of the Fen Automatic Wrench to your machines, phone, wire or write.

The Fen Automatic Wrenches are being used for driving pipe plugs on bench assemblies, operating fixtures on transfer machines and indexing machines.

The Fen Wrench will Banish "Wrench Wrestling" and increase production.

The Fen Wrench can be operated manually by push button or made completely automatic.

Why not send your wrench problems to us?

THE FEN
MACHINE COMPANY
28915 LAKELAND BLVD.
WICKLIFFE, OHIO

Logan

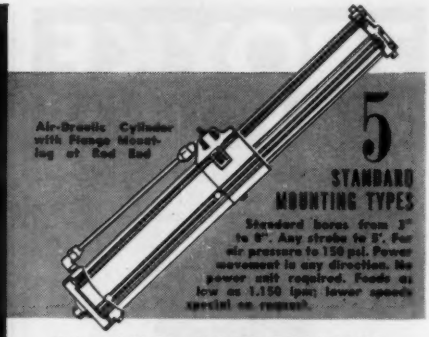
Air-Draulic®

FEED CONTROLLED CYLINDERS

Combine The Fast-Acting, Economical Low-Pressure Operation Of ..... **AIR**

With The Smooth, Uniform Controlled Regulation Of ..... **OIL**

... for Pushing, Pulling, Pressing, Clamping, Holding, Lifting, and Other Power Movements In Any Direction


Air-Draulic Cylinder with Flange Mounting at Rod End
5
STANDARD MOUNTING TYPES
Standard bores from 2" to 8". Any stroke to 5'. For air pressure to 150 psi. Power movement in any direction. No power unit required. Feeds as low as 1.150 ipm; lower speeds special on request.

NO POWER UNIT REQUIRED

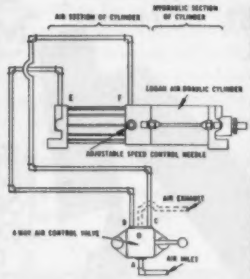
Basically, Logan AIR-DRAULIC® Cylinders are *air cylinders*, and may be used wherever compressed air is available. Yet they provide the smooth, uniform, controlled feed which is normally obtained only in *hydraulic cylinders*.

Reduced to its simplest terms, the Logan AIR-DRAULIC Cylinder is an integral unit consisting of an air piston and a hydraulic piston mounted on a single rod. The thrust or pull of the rod is obtained by means of the air cylinder, controlled by a valve or valves in the usual manner. The two chambers in the hydraulic cylinder are connected externally in a self-contained circuit; an adjustable speed control valve in this circuit regulates the flow of oil and hence the speed of the rod stroke.

Rapid return is made possible by a check valve in the hydraulic piston, permitting unobstructed oil flow on the return stroke. *Controlled feed in both directions* is also available by omitting the check valve. *Skip-feed* can be obtained through the use of cam valves applied externally in the hydraulic circuit.

The hydraulic circuit is self-contained, and no power unit is required. Logan AIR-DRAULIC Cylinders can be equipped with an automatic oil filler if desired.

Member—National Tool Builders Assn.
National Fluid Power Assn.



Basic AIR-DRAULIC Circuit with 4-Way Control Valve No Power Unit Required

HOW TO INSTALL AIR-DRAULIC CYLINDERS

The basic circuit for installation of Logan AIR-DRAULIC Cylinders is shown at the left. The air section of the cylinder is connected in the same manner as a standard double-acting air cylinder, a 4-way air control valve, piping and a connection to the main air line being required. A hand-operated air valve is illustrated, but foot-operated or other types of air valves may be used. The hydraulic section of the cylinder is a self-contained circuit and requires no additional equipment or connections.

Piping is arranged from ports B and C on the air valve to ports E and F, respectively, on the air section of the AIR-DRAULIC Cylinder. Port A is the air inlet port and port D the exhaust.

The desired piston speed is obtained by setting the adjustable needle on the hydraulic section of the cylinder. Controlled speed may be obtained on the out-stroke, the in-stroke, or both, through the internal arrangements of the hydraulic cylinder.

Logan

LOGANSPORT MACHINE CO., INC.
803 CENTER AVE., LOGANSPORT, IND.

Let Logan engineers help you design your Air and Hydraulic Circuits. No obligation.

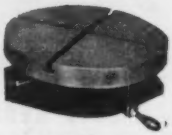
LOGAN MANUFACTURES 7,023 STANDARD CATALOGED ITEMS

FREE CATALOG ON REQUEST

AIR CONTROL VALVES, Cat. 100-4 • AIR CHUCKS, Cat. 70-1 • AIR CYLINDERS, Cat. 100-1 • AIR-DRAULIC CYLINDERS, Cat. 100-3 • AIR and HYDRAULIC PRESSES, Cat. 51 COLLET GRIP TUBE FITTINGS, Cat. 200-5 • HYDRAULIC CONTROL VALVES, Cat. 200-4 HYDRAULIC CYLINDERS, Cats. 200-2; 200-3 • HYDRAULIC POWER UNITS, Cat. 200-1 SURE-FLOW COOLANT PUMPS, Cat. 62.

TROYKE
ROTARY TABLES

- **Saves fixtures and time consuming setups.**
- **Saves time in circular positioning.**



CAM LOCKING TYPE ROTARY TABLES

Three sizes: 12", 15", 18".

This model is intended for die sinking, bench work, and assembly of machine units when quick rotation and positioning are required.

STANDARD MODELS WORM WHEEL OPERATED ROTARY TABLES

Five sizes: 9", 12", 15", 21".

For die sinking, jig boring, cam milling. Indispensable in wood and metal pattern shops.

HEAVY DUTY MODELS WORM WHEEL OPERATED ROTARY TABLES

Three sizes: 18", 21", 25".

These larger, heavy duty models are used for jig work, planer jobs, and on horizontal boring mills.

DIVIDING ATTACHMENTS or DRILLING ATTACHMENTS can be furnished

SEE YOUR DEALER OR WRITE TO US FOR COMPLETE CATALOGS

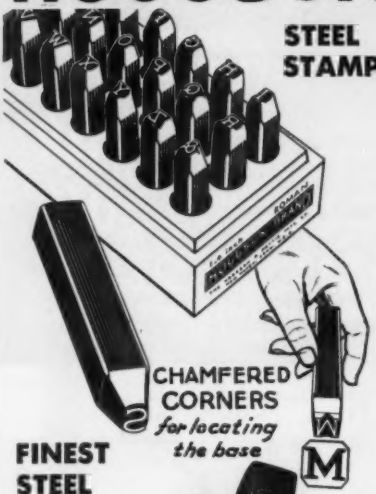
TROYKE MFG. CO.

CINCINNATI 9, OHIO

TO BE SURE OF *QUALITY* Remember the Name

HOGGSON

STEEL STAMPS



CHAMFERED CORNERS *for locating the base*

FINEST STEEL *long life*

ALSO IN REVERSE FOR MOLDS & DIES

Letters and figures, deep-cut in hardened, special-formula steel, assure clean impressions and long service. Wide range of letter sizes. At your Mill Supply or write for circulars.

HOGGSON & PETTIS MFG. CO.

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Keep a Close Check On Accuracy With SUNDSTRAND Bench Centers

Simplify assembly, lower spoilage and get better production from this modern Sundstrand Bench Center. You'll check work between centers easier, faster and within limits of .0001" on this improved Sundstrand Bench Center.

"One-hand control" over all movable elements leaves the operator's other hand free to control rotation of the part being checked. Either headstock or tailstock can be unclamped, positioned and locked in place with a single hand operating the top lever. Investigate this bench center today.

Complete Range as Follows:

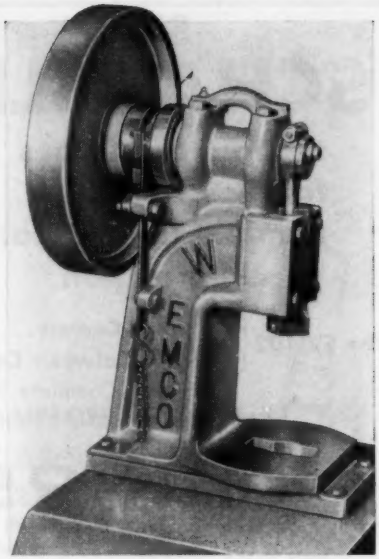
6" x 18"	12" x 48"	24" x 48"
6" x 36"	12" x 60"	24" x 60"
12" x 36"	12" x 72"	24" x 72"

FREE Additional Data

covering complete specifications and additional features is contained in this bulletin. Write for your copy. Ask for data sheet 452

SUNDSTRAND

SUNDSTRAND MACHINE TOOL CO.
2535 Eleventh Street, Rockford, Ill., U.S.A.



EMCO "W", bench type, 5-ton; also larger EMCO "X", 10-ton. Both sizes also stand-mounted. With or without motor drive.

EMCO POWER PUNCH PRESSES

are SPEEDY and SAFE

Versatile EMCO presses excel for punching, forming, stenciling and riveting metal, leather plastics and other non-metallic materials. Up to 300 operations per minute. "Big machine" speed, strength, rigidity, accuracy, endurance. Compact, fool-proof; simple design — easy to operate. Thousands of EMCOS in money-making use testify to Klaas' dependability since 1921.

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SCHAUBLIN

toolmakers' lathes for those who demand the ultimate in precision

The SV 102 { Height of Centers..... 4"
Distance Between Centers 17"

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Largest Selection of **SWISS** Precision Machine Tools in U.S.

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Branches: Chicago, Detroit, Los Angeles
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No. 111

New and Useful!

WHITNEY-JENSEN

HAND PIPE CRIMPER

WEIGHT ONE POUND

PRICE ONLY **$6.50** F.O.B. FACTORY

SAVE TIME ON THE JOB!

There are many times when you want to put a few quick crimps in a pipe-end, a duct, or an edge. HERE is the tool to do it! Light-weight, easy to use, and easy to carry in your kit. Makes good crimps any length up to 1½ inches. Capacity 20-guage galvanized sheet or the equivalent. Spring-return jaws. Polished handles. A Whitney-Jensen QUALITY Tool. Order yours today...

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NEW CATALOG
SHOWING OVER 75 USEFUL TOOLS

GOOD METAL-WORKING TOOLS SINCE 1910
WHITNEY METAL TOOL CO.
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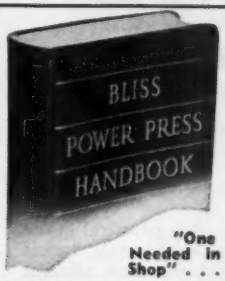
*NIROL the incomparable COMPENSATING LIVE CENTER

Permits perfect support of all loads and thrusts. Reduced overhang adds rigidity and increases machine capacity. Compensating factor provides for work expansion from heat while machining.

Write for complete information.

*Registered U.S. Patent Office

NIROL MFG. CO.
900 HIGHWAY 22, N. PLAINFIELD, N. J.



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"One or Several Are Needed in Every Stamping Shop" . . . *American Machinist*

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Sections on: Computing press jobs • Selecting proper press • Useful engineering tables • Die illustrations • Complete glossary. Plus a service section for Bliss presses. $7.50

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THE DIFFERENCE IS IN THE *Point*

TUNGSTEN CARBIDE...

Westfield gage indicator points have permanently fused Tungsten Carbide balls, unequalled in hardness and durability.

Now, with this new process, gage indicator points last indefinitely without flattening.

New Indicator points may be purchased complete for $4.50 each. They are made to fit Last Word, Gem, Brown & Sharpe No. 743 and Federal Testmaster in all current size balls. When ordering Federal Testmaster, specify if you want 1/10 type (short) or 1/1000 type (long). $1.00 credit can be had for worn points.

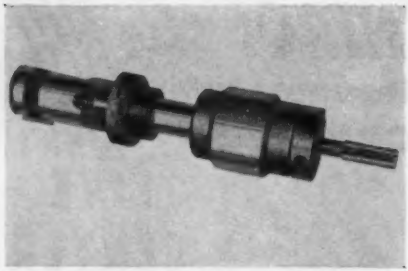
ORDER TODAY

WESTFIELD GAGE CO.
53 Church Street
WESTFIELD, MASSACHUSETTS

Gage measures internal diameters of small holes

New Standard Division, U. S. Expansion Bolt Co., Dept. B, York, Pa., has introduced a direct-reading hole gage which measures the internal diameters of small holes ranging from .020" to .130", and which is claimed accurate to within .0005" over the entire range.

The instrument is called "Kwik-Chek" and is similar in appearance and operation to a ball-point pen or automatic pencil. In operation, only one hand is required.



The scale is graduated in thousandths of an inch.

Use ACTION Card, opposite page 64. Encircle No. 50

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174 REASONS WHY NELCO CARBIDE TIPPED END MILLS...

MAKE "JACK-OF-ALL-TRADE" TOOLS *Obsolete!*

174 different end mills — in diameters varying from 1/4" to 5" — with 2, 3, 4 or 6 flutes — and straight or taper shank — make Nelco the line with the widest selection of standard sizes!
On every application, every material — there's a specific Nelco end mill in stock designed to do the job — and do it better, quicker and at less cost than it's ever been done before!
Specific rake angles are engineered for each individual tool.

Selection of the hardest practical grade of carbide for each end mill makes available from stock the most efficient tool to do your specific job!
All Nelco End Mills are spiral fluted for easier chip clearance, finer finish and superior tool performance.

Eliminate "jack-of-all-trade" tools! Call the Nelco distributor in your vicinity and send today for your free copy of the new 48-page Nelco catalog.

NELCO TOOLS *For that Extra Edge in Production*

NELCO TOOL CO., INC.
MANCHESTER, CONN.

Star Quality
Costs No More

why not get these

SAFE, UNBREAKABLE

high speed blades from your STAR Distributor?

For over 75 years, industry has *known* STAR Hand and Power Hacksaw Blades as *quality* blades.

Here, as an example, is the STAR Unbreakable High Speed Steel Blade—safe, fast-cutting, long-lived. The STAR combination of a flexible steel back, special-process weld and high speed steel cutting edge adds up to an efficient, shatterproof, proved-quality blade.

STAR SERVICE COSTS NO MORE

Order any of the complete line of STAR Blades from your Industrial Distributor—your best source of supply for hundreds of the items you need to operate efficiently, economically, and without production interruptions.

Sold Only Through Recognized Distributors

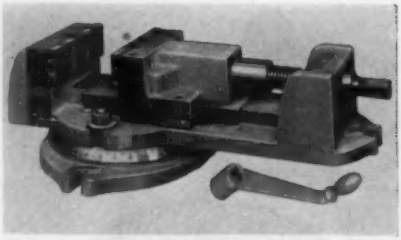
CLEMSON BROS., Inc.
MIDDLETOWN, N. Y., U.S.A.
Makers of Hand and Power Hack Saw Blades, Frames, Metal Cutting Band Saws and Clemson Hand and Power Lawn Machines.

1016

Heavy duty machine vises

The first two models of a new line of heavy duty vises for use on milling machines and other machine tools are claimed to be outstanding for their precision, sturdiness, and large opening capacity.

The vises are available in 6" jaw widths in two styles; with graduated swivel base, or stationary flanged base. Wilton Tool Mfg. Co. Inc., Dept. B, 925 Wrightwood Ave., Chicago 14, Ill.



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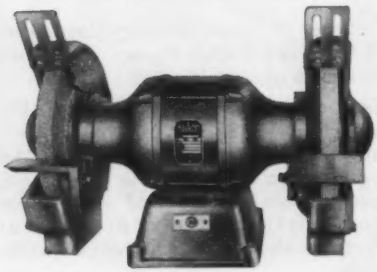
BALDOR GRINDERS

BALL BEARING - TOTALLY ENCLOSED - HEAVY DUTY



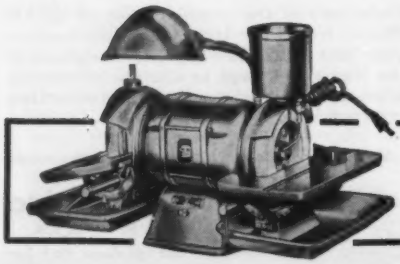
Baldor Grinders are available in bench and pedestal types with 6" to 12" wheels. Baldor Grinders are better because:

More Rugged — Arbor diameter ⅞" and "sealed-for-life" ball bearing Size .05.

More Versatile — Wide clearance between wheels and motor frame permits grinding of large or odd shaped pieces.

Baldor is a basic manufacturer of grinders—even the motors are built by Baldor.

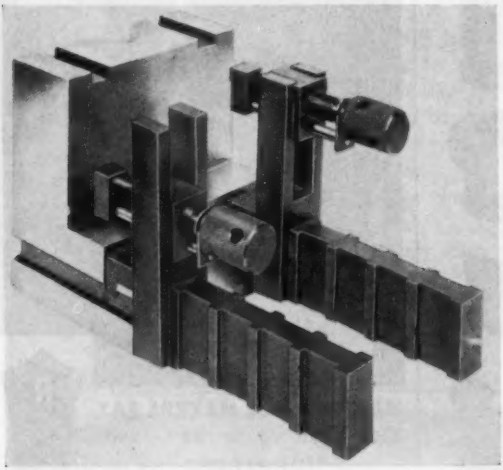
Baldor 10" Series Grinder ¾ h.p., 1 phase, 60 cy., 1725 rpm, 10" wheel. $134.00



Special Carbide Tool Grinder built especially for sharpening carbide tools quickly and accurately. Reversible ½ h.p., motor withstands repeated overloads. $149.00.

BALDOR ELECTRIC COMPANY
4368 DUNCAN AVE. ST. LOUIS 10, MO.

SQUARING is one of the two most important operations in producing tool & machine parts.—Set ups for making things round are simple. But since a body can have six surfaces square to each other, it requires six set ups to machine or grind them. This has been a cumbersome procedure



—UNTIL—

WE DECIDED THAT CONVENTIONAL VISES CAN NOT BE KEPT SQUARE WHEN IN USE BECAUSE OF DISTORTION, THEREFORE ARE POOR SQUARING DEVICES.
ANGLE PLATES ARE GOOD FOR FINISHING ONE SURFACE AT ONE SETTING SO A JOB MUST BE RESET FOR EACH ONE.

SQUAR-VISE combines the advantages of vises and angle plates with some startling innovations added. Its body is square and can be set up in different positions without removing the job.

SQUAR-VISE is equipped with two quickly removable, infinitely positionable jaws permitting pressure to be applied to best advantage.

SQUAR-VISE is a machine vise as well as a surface grinder set up.

IT WILL AMAZE YOU

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KEARSARGE TOOL & MFG. COMPANY

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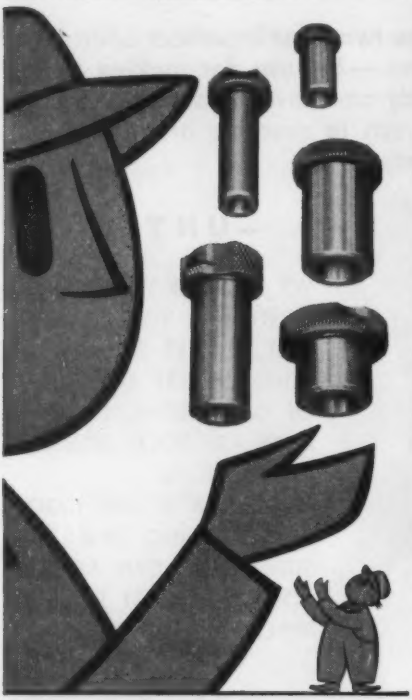

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Industry's standard of quality and service

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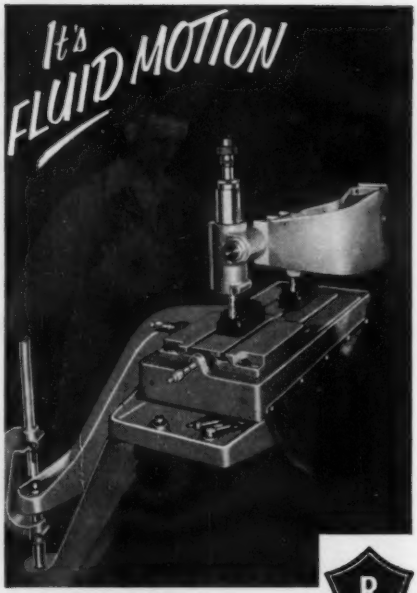

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MOUNTS ON ANY BRIDGEPORT MILLING MACHINE

- DUPLICATE any shape 2 or 3 dimensional with ease
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115 East Washington Ave., Bridgeport 8, Conn.
(Dealer inquiries invited)

IF you must cut production costs

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without machining, you can:

Accurately locate and secure drill bushings,
Center and secure shafts in Alnico rotors,
Anchor spindles in abrasive wheels,
Locate and secure fixture fittings in assembly frames,
Anchor sleeve bearings and non-moving parts in machinery.

Bulletin A1 shows how Cerro Alloys can save time and money in above operations. Write for it today.

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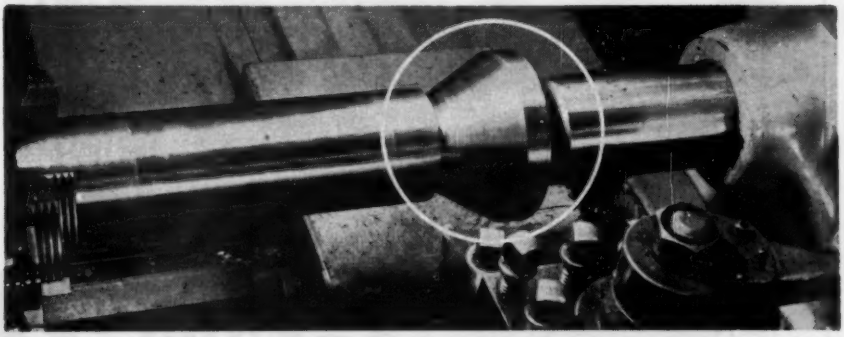

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Users everywhere praise ROOFE Live Centers for increasing production, lowering costs and for giving maximum accuracy.

Made of the finest alloy steels, standard types are available in Morse Taper, Brown & Sharpe, Jarno, straight or special shanks to your specifications. Write for catalog.

Reliable distributors wanted.

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INSPECTION TOOLS made of MEEHANITE METAL are designed to fill your various Inspection and Checking needs. Sturdily constructed to give you reliable, accurate service.

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Slotted Angle Plates
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Toolmakers' Knees — "V" Blocks
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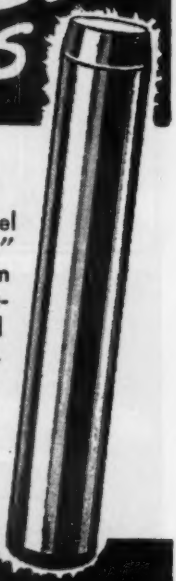

Immediate Delivery!

Standard Size Dowel Pins from 1/8" to 1" diameter and from 3/8" to 6" length supplied in .0002 and .001 over basic sizes. Unless otherwise specified, .0002 oversize will be furnished.

Dealer's Inquiries Invited.

SCHULTZ & ANDERSON COMPANY

111 EDISON PLACE
NEWARK 5, N.J.

John L. Patterson

Aluminum Company of America, Pittsburgh, has named **James P. Haight** to the newly created post of chief engineer. **John L. Patterson** is now general manager of the fabricating division.

The Barnaby Manufacturing Company, Bridegport, Conn., has appointed **Louis S. Kutscher** as sales manager for the metal working tool, record dies and accessories, railway gages, hardware, and special equipment divisions.

James P. Haight

NEW SWIVEL-ACTION

BURRQWIK

HAND DEBURRING TOOL

pays for itself in one day!

the UNIVERSAL ANSWER

Patent No. 2598443

Deburrs 4 jobs for every 3 deburred with old-style tools. Patented swivel-action leads blade along edges... no more nicks, scallops, or wrist and arm fatigue.

Hardened high speed tool steel **interchangeable blades**—small blade for tubing and small holes—a larger blade for straights, radii and large tubing.

Use BurrQwik for all metals and plastics—for cut, punched, molded and processed edges.

TRIAL SAMPLE!

Without obligation... test—try BurrQwik on your own production jobs—prove its value!

Rated companies may request on letterhead a complete BurrQwik set 500. Act today! Include name and address of your regular industrial supply house.

Anodized aluminum handle and 2 blades, in tough vinylite Pocket Pak—ready for instant use!

A WORLD OF KNOW-HOW

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Commander
TAPPER

- **Wider Range . . . 1 Tapper Handles No. 0 to ¾" Taps**
- **Automatic Tap Protection**
- **Furnished to fit ANY Drill Press**

Commander—"The Tapper That Thinks For Its Operator," has the adjustable full range torque control that instantly stops any tap when it becomes dull, loaded, strikes a hard spot or bottoms in blind hole tapping. Assures maximum tap protection, higher production, even with inexperienced operators.

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Any operator does precision tapping with a *Commander* TAPPER

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Product of Commander . . . Builder of Production Tools

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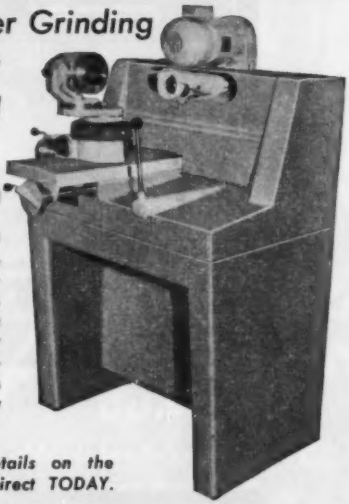
NOW--- More Tool & Cutter Grinding Capacity for ½ the usual cost!

The NEW STERLING Tool & Cutter Grinder (Model RK-2)



This single purpose tool & cutter grinder handles reamers, end mills, form tools, lathe tools, etc., including milling cutters up to 11" diameter between centers, 22" diameter on the workhead. New design that eliminates the heavy, expensive tables provides a machine with more tool & cutter grinding capacity at about ½ the cost of a universal grinder. The STERLING Model "RK-2" is ideal where more tool & cutter grinding capacity is wanted.

See your STERLING Dealer for details on the STERLING Model "RK-2" or write direct TODAY.

McDONOUGH MFG. CO. 1520 GALLOWAY STREET EAU CLAIRE, WISCONSIN

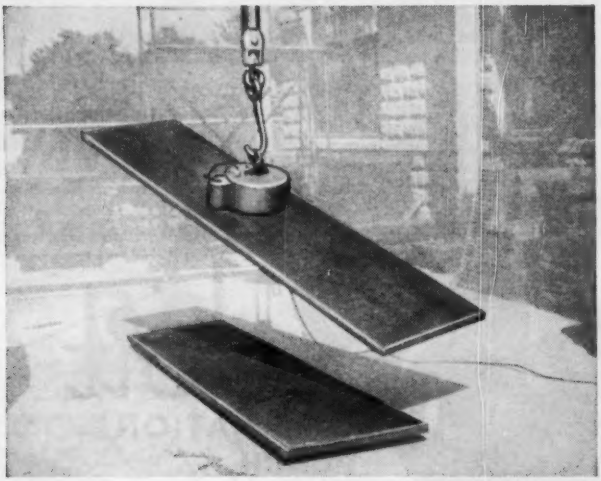
W. J. Herrmann

The Gairing Tool Co. has announced the appointment of **B. E. Logsdon** as sales engineer on machine tool applications and special assignment, working from the company's office at Detroit.

Appointment of **William J Herrmann** as factory manager of the Detroit plant has been announced by Berton E. Rogers, general factory manager of Vickers Inc., Detroit, Mich.

Herb Ainsworth

Walker Does It Again-



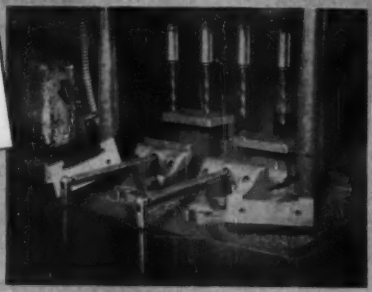
WALKER LITTLE GIANT—the most powerful lifting magnet yet designed will lift 1000 pounds, utilizing less energy than the ordinary 150-watt kitchen lamp . . . can be designed for all voltages from a 6-volt car battery to 220-volt DC power line . . . practical for electric powered trucks and lifts.

O. S. WALKER CO. Inc.

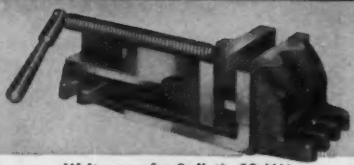
WORCESTER 6, MASSACHUSETTS

Original Designers and Builders of Magnetic Chucks

Here's PROOF that ~~SPEED VISE~~ is a fast production tool



Here's a production set-up on a multiple spindle semi-automatic drilling machine that is really cutting manufacturing time and costs. The use of two Speed Vises eliminates the need for expensive and complicated fixtures and at the same time increases the production range. With Speed Vise it is only necessary to make a simple jaw plate to fit the parts being machined and to hold drill bushings, etc.



- ★ Quick action design for speed. Opens instantly to full capacity to handle work of any size.
- ★ Standardized holes for attaching jigs or jaw plates.
- ★ Lift . . . slide . . . lock . . . that's all there is to the fast, positive locking action.
- ★ Heavy, semi-steel castings for extra strength and a heavy base plate for rigidity.

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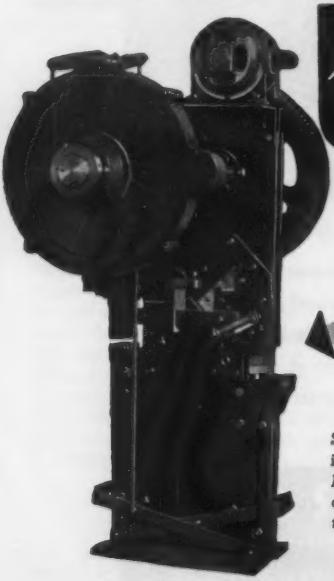
CARDINAL MACHINE CO.

1819 Dana Street, Glendale, California



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COMBINATION PUNCH, BAR SHEAR, ANGLE SHEAR and NOTCHER

Here's the ideal equipment for shearing, mitering, notching and coping angles. This model also shears flat and round bars. Punches to the center of 10" without changing the set-up. Versatile. You'll find many jobs for this Beloit machine . . . and the savings will more than pay for it! !

Send for illustrated literature and prices today.

Write for complete details.

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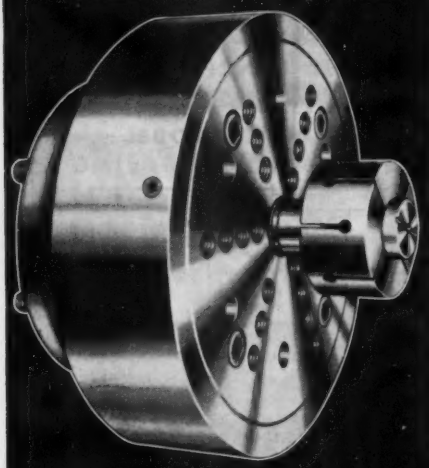
100 Blackhawk Blvd. Beloit, Wis.



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CALDWELL Adjust-A-Leg EQUALIZING and LOCKING SLINGS

With an ADJUST-A-LEG Equalizing Sling, unbalanced and "hard to get hold of" loads may be handled as easily as simple loads. As the tension of the lift comes on, the legs automatically adjust themselves to proper lengths and *frictionally lock in position.* The load is raised level . . . with *no* fuss, *no* bother, *no* figuring — the Sling does it! Sizes ½-ton to 50-ton.

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ELECTRIC BOX TYPE • FLOOR AND BENCH MODELS

For Tools and Small Parts

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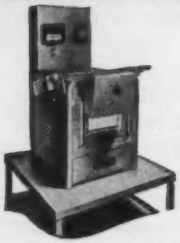
THE COOLEY BENCH MODEL
for HARDENING AND TEMPERING



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1850°	8" x 6" x 14" 10" x 6" x 18" 10" x 8" x 18"	$255 to $655
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All prices are less controls. Any standard controls available for automatic temperature control.

- Available with hinged or vertical lift door.
- Heating elements fully protected from mechanical or atmospheric destruction.

Controlling Pyrometers carried in stock — available for all applications.

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An amplifying gage of semi-optical design for gaging outside dimensions, lengths and thicknesses precisely and rapidly.

Its unusual design makes it sensitive enough for the finest tool and gage inspection, with the necessary ruggedness for fast, day in - day out - production inspection.

Brightly illuminated screen makes the readings unmistakable, at a glance. Adjustable red tolerance shield shows undersize pieces and green tolerance shield shows oversize pieces.

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Reads in .00005" - Range ± .005"
Capacity 6"

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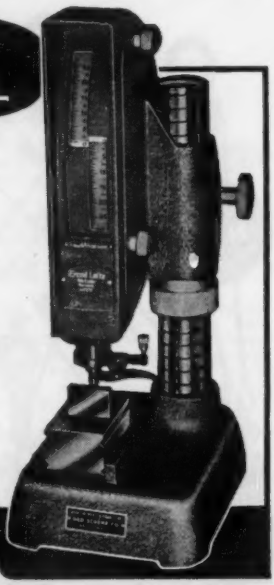
In certain territories inspection may be arranged



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Automatic RECESSING TOOLS

REDUCE INTERNAL CUTTING COSTS

These fully automatic, quickly adjustable tools save time, cut costs on precision grooving, undercutting, inaccessible spot facing, chamfering, back facing and necking.

They are used with jig or fixture on automatic or manual feed machines. Long-life circular form cutters, or tool bit holders with tool bits may be used. Location and diameter of recess are individually controlled by stop collars, adjustable to within ± 0.001-inch. Five sizes available to pilot into 1" to 2¼" bushings. Furnished with shank to suit.

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1151-MC

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for new catalog showing prices and complete line of Equipment.

DURANT Tool Supply Co.

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LARGEST variety of . . .

standard circular FORM TOOLS and BLANKS.
Over 600 sizes carried in stock for
IMMEDIATE DELIVERY.

It's no longer necessary or economical to "hand grind" tools or purchase "made to order" tools for short run jobs. Let SOMMA STANDARD CIRCULAR FORM TOOLS give you uniform, correct dimensions, better finish and appearance, less set-up trouble. In short—maximum production at the lowest cost.

Send for new catalog now listing DAVENPORT STANDARD TOOLS and BLANKS as well as many new sizes of BROWN & SHARPE STANDARD TOOLS and BLANKS.

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Manufacturers of Standard and Special Precision Form Tools
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AVAILABLE LITERATURE

FREE CATALOGS AND BULLETINS AVAILABLE FROM MANUFACTURERS

For copies of the literature in which you have an interest use the postage-paid postcard on the next page. Merely circle the identifying numbers and mail the postcard.

1. Slide Rule. Folder describes the DIWA Slide Rule, distributed by Harry Hoffman, 284-B Madison St., Passaic, N. J. The rule is deeply engraved and the surface is resistant to acids, oils, etc., and is made of Divinyl. It comes in a leather case. Folder includes diagrams and some examples of advertising slide rules made to internationally reputed companies.

2. "What's New in Roll Lapping?" Spitfire Tool Co., Dept. MB, 2931 N. Pulaski Rd., Chicago 41, Ill., has issued a new 3-color bulletin covering their precision roller lapping machine "12." The bulletin is designed to enable the reader to get facts without having to wade through wordy build-up paragraphs. It is a veritable encyclopedia on roller lapping.

3. "Why Abrasive Wheels Fail—Sometimes." This is a 40-page, illustrated, pocket-size book written in easy to understand form. It explains why abrasive wheels sometimes fail and how to prevent this failure. It also serves as a reference book for users of abrasive cutting equipment. Copies free if requested on company letterhead, otherwise 50 cents per copy. Available from Wallace Tube Co., Dept. BB, 1304 Diversey Parkway, Chicago 14, Ill.

4. Packing Selector. Developed by the New York Belting & Packing Co., Dept. B, 1 Market St., Passaic, N. J., the selector is a cardboard disc, six inches in diameter, gives packing styles and pressure and temperature readings for the four types of packing application, gaskets, valve stems and centrifugal and reciprocating pumps. The selector is also useful for laundries, creameries, food

packing plants, refrigeration systems and cold storage houses, machine shops, offices and public buildings.

5. High Speed Precision Indexing of automatic production machinery is covered in a new 20-page catalog (No. 105) from Ferguson Machine & Tool Co., Roller Gear Div., Dept. MB, St. Louis 21, Mo. Catalog describes increased line of standard Ferguson Roller Gear Drives and gives complete tables on load ratings and dimensions for components only and housed units are given as well as data and instructions for calculation of loads, designing and installation and selection of a drive.

6. Air Control Unit. Bulletin AV 300R illustrates and describes the Electroaire Valve, made by Bellows Co., Dept. MTB-54, 222 W. Market St., Akron 3, Ohio. The 8-page bulletin shows installation photographs and describes in detail all parts and functions of the air control unit, including dimensional drawings and specification data. Schematic wiring diagrams are also shown.

7. Cutter Grinding Aids. Ingersoll Milling Machine Co., Dept. MTBD, Rockford, Ill., has issued a new 52-page booklet which describes recommended cutter grinds for different materials, types of cuts and quality of finish required. It is also a handy reference for tool grinders and machine shop supervisors, and presents information and drawings on 14 basic grinds.

8. Hardness Tester. A new, 4-page illustrated folder describes the King Portable Brinell Hardness Tester and is available from Andrew King, Box 606-H, 67 E. Lancaster Ave., Ardmore, Pa. The tester makes standard Brinell tests and can be used as a bench tester or taken to the job and used in any position. The folder describes how the precision instrument puts a load of 3000 kg on a 10-mm ball and other loads as required and how the removable test head makes it possible to test parts of any size.

9. Alloy Steels. A newly revised catalog issued by the Carpenter Steel Co., Dept. BB, Reading, Pa., describes two chrome-nickel alloy steels reported capable of handling 95% of all alloy jobs. One grade, Carpenter No. 158, is a case-hardened steel. The other, Carpenter No. 5-317, can be either a hard-tempering or tough-tempering steel, depending upon heat treatment.

10. Plain Cylindrical Grinder. A new 16-page catalog describing the Landis Tool 4" Plain Cylindrical Grinder for precision cylindrical grinding operations is available from Landis Tool Co., Dept. BB, Waynesboro, Pa. This hydraulically operated grinder will handle small parts on a high production basis. Catalog is illustrated with 37 pictures and sketches.

11. Milling Machines. New 20-page booklet from Cincinnati Milling Machine Co., Dept. BB, Cincinnnati 9, Ohio, covers design highlights and benefits, functional diagrams, specifications, equipment and attachments and full length pictures.

12. Micro-Bore Drill Jig Bushings catalog from Prebco Bushing Co., Dept. MTBD, 37 St. Joseph St., Arcadia, Calif., includes diagrams and tables of bushings for drill sizes from No. 80 to 3/32.

13. Universal Expanding Mandrels. The Le Count Tool Works, Inc., Dept. MB, 390 Capitol Ave., Hartford, Conn., has released a 4-page folder describing their line of precision mandrels, which covers type "A" Count-Centric Expanding Mandrel having guaranteed concentricity within .005" total indicator reading and the new Type "S" Super Count-

Centric Expanding Mandrel with guaranteed concentricity within .0002" total indicator reading.

14. Plug Gauges. Deltronic Corp., Dept. BB, 9010 Bellanca Ave., Los Angeles, 45, Calif., 4-page folder describes companys Tenth plug gauges. Folder covers 25-gauges set which company claims cover a wide range of tolerances and which may be used as "work gauges and inspection gauges.

15. Keyseat Cutter. Quality Tool Works, Dept. BB, Waukegan, Ill., has issued a bulletin describing new style keyseat cutter, featuring a tapered shank, premium grade HSS and a special surface treatment after the cutter is finish ground. Cutters are available in 41 standard sizes from stock, or special sizes made to order.

16. Guide Pin Bushings. A new 12-page catalog featuring guide pin bushings and guide pins has been issued by Lamina Dies and Tools, Inc., Dept. MTB, P. O. Box 31, Royal Oak, Mich. Photos of actual items, detailed line drawings with dimensions are printed in two colors.

17. Plastic Pipe, Fittings & Valves. Technical data on Dur-Ace, a new general purpose corrosion-resistant plastic pipe, is provided in Bulletin 80-A, available from American Hard Rubber Co., Dept. BB, 93 Worth St., New York 13, N. Y. General properties of the plastic pipe, chemical resistance tables, standard sizes and pressures are included in bulletin.

18. High Speed Carbon and alloy steel drill rod information is available in a new leaflet from Allegheny Ludlum Steel Corp., Dept. MTB, 2020 Oliver Bldg., Pittsburgh 22, Pa. Grades, lengths, size ranges, finishes and tolerances included. Standard drawn drill rod shapes and special shapes available are described.

19. Pantograph Engraver. A new brochure available from Green Instrument Co., Dept. BTM, 386 Putnam Ave., Cambridge, Mass., describes in detail Model D-2 Heavy Duty Pantograph Engraver. This engraver is open on three sides and equipped with a single vertical adjustment for both spindle and copy table.

20. Pressure-Wet Blasting Equipment. Two new technical bulletins are available from Cro-Plate Co., Inc., Dept. BB, Hartford, Conn. Bulletins are: "Cleaning Prior to Electro-Plating with Pressure Blast," and "Deburring with Pressure Blast." Both applications are described in detail and accompanied by illustrations depicting manually and automatic operated equipment.

21. Clutches. A new clutch catalog, No. 102, available from Formsprag Co., Dept. MTBD, 23601 Hoover Rd., Van Dyke, Mich. Included are photographs, application drawings and engineering and specification data for each of the six standard clutch lines.

22. The Tru-Cast Handbook. An illustrated 48-page book issued by Manco Products, Inc., Dept. B, 2401 Schaefer Rd., Melvindale, Mich., is an authoritative guide to the use of beryllium copper pressure-cast cavities and cores in applications including injection molding, zinc die casting, and stamping dies.

23. Electronics Dictionary. Allied Radio Corp., Dept. BB, 100 N. Western Ave., Chicago 80, Ill., has issued a revised edition of "A Dictionary of Electronic Terms" containing over 3,500 terms used in television, radio and industrial electronics. Copies available at 25 cents each.

THIS HELPFUL LITERATURE NOW AVAILABLE

24. Screw Machine Stock. An ingenious brochure with an actual aluminum part attached citing the advantages of lightweight metal for screw machine stock is available from Kaiser Aluminum & Chemical Sales, Inc., Dept. MB, Industrial Service Div., 1924 Broadway, Oakland, Calif. The brochure entitled "New Angle on Greater Profits," has a knurled cap fastened to a drawing of a piece of aluminum stock protruding from a screw machine collet and illustrating tool angle.

25. Brush Digital Instruments. A new brochure detailing a series of five related digital instruments for automatic counting, recording, and control, is available from Brush Electronics Co., Dept. BB, 3405 Perkins Ave., Cleveland 14, Ohio. Four-page folder illustrates and describes fundamental facts covering these instruments.

26. Automation Standardization. The field of automation has created a need for the standardization of precision instrument parts and mechanical components. To meet this need, PIC Design Corp., Dept. MTB, 160 Atlantic Ave., Lynbrook, L. I., N. Y., has completed all design engineering and prototype development for such a standardization program. A 64-page catalog illustrates complete line of precision shafts, gears, collars, couplings, differentials, breadboard equipment etc. and all items are dimensioned for design layout.

27. "Steel Oilite." A 4-page folder release by Amplex Division of Chrysler Corp., Dept. BB, P.O. Box 2718, Detroit 31, Mich., gives complete data on a new sintered material called "Steel Oilite." Company claims that parts made of Steel Oilite have a high degree of ductility; have a greater impact resistance and fatigue strength; and have strength in the range of low carbon steel.

28. Detector Systems. A new brochure by W.F. & John Barnes Co., Dept. BB, 301 S. Water St., Rockford, Ill., entitled "Electro-Graphic Detector Systems" describes a recent development by the company's engineers for simplifying the maintenance of complex electrical controls. New wire-in checking systems, consisting of separate electrical circuits wired to schematic electrical diagrams are designed for automation equipment.

29. Cutting and Grinding Fluids. A new booklet from S. C. Johnson and Son, Inc., Dept. MTBD, Racine, Wis., describes advantages of wax in metalworking and gives the comparative machinability rating of various steel grades.

30. Split Ball Bearings. New catalog, No. 54, from Split Ballbearing Corp., Dept. MB, Lebanon, N. H., shows a complete line of ball bearings, load and speed ratings, design data, dimensions, etc.

31. Air Gaging Reconditioning. Freeland Gauge Co., Dept. B, 9940 Freeland Ave., Detroit 27, Mich., has issued a folder describing company's air gage member restoration service.

32. Indexing Turntables and Variable Speed Controls. Eisler Engineering Co. Inc., Dept. MB, 750 S. 13th St., Newark, N. J., has issued a new catalog No. 88-55, covering indexing machines. Indexing range from 1 to 400 rpm.

33. Multi-Purpose Fastener. The new Tuff-Tite multi-purpose fastener with a one-piece metal head and pre-assembled neoprene washer is featured in a new brochure from Townsend Co., Dept. MB, New Brighton, Pa. Brochure explains design and components of fasteners, and lists several typical applications in construction, automotive, ap-

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pliance and farm equipment industries.

34. Microsize Lubricant. Bulletin 104, a two-page folder describes the new Molykote Microsize Lubricant made by Alpha Corp., Dept. MBM, 65 Harvard Ave., Stamford, Conn. Featured is a graphic picturization of the relative particle sizes of molybdenum disulfide powders in relation to their ability to penetrate the crevices of ground bearing surfaces.

35. Mother of Employment—Automation. A cleverly-written booklet from The V & O Press Co., Dept. BB, Division Emhart Mfg. Co., Hudson, N. Y., uses examples gathered during company's 65 year's of engineering and automated precision power presses and feeds. It traces the development of presses and manufacturing from the time a V & O No. 0 press sold for $81.

36. Stainless Steel. A new catalog from Alloy Tube Division, Carpenter Steel Co., Dept. MB, Union, N. J., gives a complete description of Carpenter Stainless No. 20 and 20-Cb. Both the basic No. 20 alloy and the columbium-stabilized analysis are sulphuric acid resisting steels. Twenty page illustrated catalog gives applications and working characteristics.

37. Microhoning Tools. Micromatic Hone Corp., Dept. BB, 8100 Schoolcraft Ave., Detroit 38 Mich., has issued a new catalog covering, microhoning advantages and formula, cylindrical microhoning equipment, finishing flat surfaces, tools, fixtures, abrasives and services.

38. Brake Manual. A new 16-page brake manual illustrating how a single Di-Acro Brake can be converted into a bar folder, tab former, radius former, open end brake, standard brake or box and pan brake by changing the top forming bar has been issued by O'Neil-Irwin Manufacturing Co., 410 Eighth Ave., Lake City, Minn. Manual also contains more than 35 photos and diagrams

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showing ways the 10 models of Di-Acro Standard, Box Finger and Radius Brakes can be setup for production.

39. Comparison Chart. A quick reference chart, printed in two clors on enamel finished stock, listing overall, flute and assembled lengths of drills with utility or split sleeves. Size 8½ x 11½ inches, punched for hanging on wall for quick reference. Available from Chicago Latrobe, Dept. MTBD, 411 West Ontario St., Chicago 10, Ill.

40. Heat Treated Threading Heads Bulletin No. F-90-2, from Landis Machine Co., Dept. BB, Waynesboro, Pa., includes detailed data on all Landis heat treated heads, both standard and special. All die heads are illustrated and specifications are given.

41. Tool Catalog. A new 32-page catalog has just been published by R and L Tools, Dept. BB, 1825 Bristol St., Philadelphia, Pa. Catalog lists entire R and L line, including turning tools, carbide or roller backrests, releasing or non-releasing tap and die holders, universal tool post, cut-off blade holders, recessing tool, revolving stock shop, floating drill holder and knurling tool.

42. Circular Saws. A new illustrated Catalog from Circular Tool Co., Inc., 765 Allen Ave., Providence, R. I., covers slitting saws, cut-off saws, slotting and commutator slotting saws, circular knives, drills and reamers. Engineering data and tables also included.

43. Quenching Oil. Sun quenching oil No. 11 is described in a new Sunoco Technical Bulletin. This oil's high thermal stability and high boiling range make it particularly suitable for quenching systems requiring a high flash point. It is also suitable for bright quenching from controlled atmosphere furnaces. Available from Sun Oil Co., Dept. BM, 1608 Walnut St., Philadelphia, Pa.

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44. Motor Drives. Four-page folder from Schultes Level, Inc., Dept. MTBD, 17403 Gable St., Detroit 12, Mich., describes motor drives for lathes, shapers, milling machines, drill presses and punch presses. Illustrations include cut-away picture of motor drive and installation photos.

45. Anniversary Booklet. A special 16-page issue of "Moore News" has been published by Moore Special Tool Co., Inc., Dept. MB, Bridgeport, Conn., to mark the company's 30th anniversary. Booklet traces company's history and announces several major new-product developments.

46. Precision Instruments. New 20-page booklet from Daco Machine & Tool Co., Dept. MTB, 202 Tillary St., Brooklyn 1, N. Y., contains illustrations of machine tools, and inspection gages, and

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enviromental test chambers. Included also are illustrations with explanatory notes of some of the intricate tools and fixtures, and complete instruments produced by Daco.

47. Horizontal Boring, Drilling & Milling Machines. The Cincinnati Gilbert Machine Tool Co., Dept. BB, Cincinnati 23, Ohio, has issued a new 24-page bulletin on floor type horizontal boring, drilling and milling machines. It contains specifications, photographs of equipment in use, description of design details and of arrangements with bed plate, openside boring bar support, adjustable table, auxiliary table, box tables, and stationary table.

48. Carbide Tipped Cutters. A complete line of carbide-tipped combination ream, counterbore and facing tools for forming the standard female fitting in the AND-10050 design standard. The

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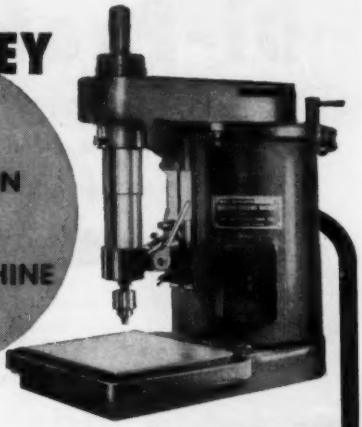

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tool is made in two styles; one for screw machines or turret lathes; and one for drill presses. A data sheet by the company describes the engineering features of the tools and provides useful information on AN ports. Available from Wetmore Tool & Eng. Co., 5318 E. Washington St., Los Angeles 22, Calif.

49. Spindles. The Whitnon Manufacturing Co., Dept. MBB, 217 High St., New Britain, Conn., has issued a new 2-page folder describing the Whitnon Spindles for new or rebuilt surface grinders. Folder is illustrated and includes high cycle applications, external grinding, tool and cutter grinder and special applications.

50. Drill & Boring Tool. The Hardy Tool & Machine Div., Spectol Corp., Dept.

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RECIPROCATING HAND MACHINE

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BB, 10 Bridge Street, New York 4, N. Y., has published a two-page folder describing the "Hardy" Drill and Boring Tool, Model AMV for drilling holes 1½" diameter and over. Specifications and illustrations included.

51. Safe Feeds & Speeds Chart. Helpful chart issued by Chicago Latrobe, Dept. BB, 411 W. Ontario St., Chicago 10, Ill., is 8¾" x 11⅛" in size, shows drill diameters and safe feeds for cast iron, bronze, brass, drop forgings annealed, drop forgings heat treated, steel castings and mild steel.

52. Portable Pumps—Coolant Systems. Easy Industries, Dept. MTBD, 162 North Clinton St., Chicago 6, Ill., has published a four-page folder describing portable pumps, coolant systems and lubricating systems. Folder includes diagrams, spe-

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cifications and illustrations.

53. Vertical Turret Lathe. Introduction of the new Bullard Cut Master Vertical Turret Lathe, Model 75, is contained in a new 20-page booklet from The Bullard Co., Dept. BB, Bridgeport, Conn. Booklet is illustrated in three colors and includes diagrams, specifications and table speeds.

54. Drill Bushings. Ace Drill Bushing Co., Dept. B, 5407 Fountain Ave., Los Angeles 29, Calif., has issued a folder illustrating the company's drill bushings, available in over 22,000 sizes, types and specifications of ASA. Folder includes drill sizes with their decimal equivalents.

55. Barrel Degreaser. The Baronet Barrel Degreaser made by Baronet Industries and available from P. K. Neuses, Inc., Dept. BB, 1103 W. Euclid Rd.,

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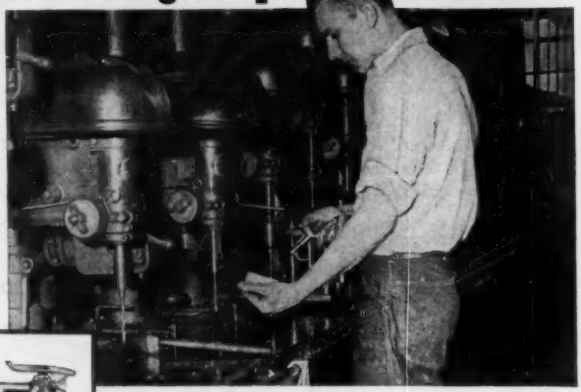

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56. Slide-Rule Calculator. A calculator designed to aid screw machine stock buyers and operators to make quick stock requirement estimates on aluminum parts is available from the Industrial Service Div., Kaiser Aluminum & Chemical Corp., 1924 Broadway, Oakland 12, Calif. This device gives the amount of aluminum stock needed for 1,000 screw machine parts with combination dimensions ranging from ¼" to 3" in length and ⅛" to 3½" in diameter.

57. Dry Centrifugal Dust Collector. American Air Filter Co. Inc., Dept. MTBD, Louisville 8, Kentucky, has

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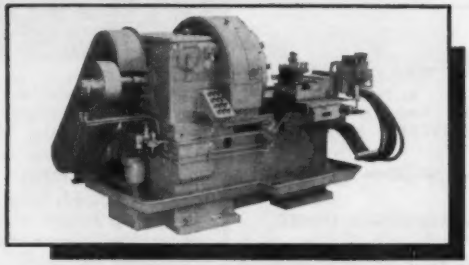

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published Bulletin No. 291 which introduces a new principle in dry centrifugal dust separation. It is designed to handle large exhaust volumes of granular dust. Bulletin is illustrated and includes diagrams, table technical data.

58. Precision Gage. The Fuller Gage, made by Fuller Gage Co., Dept. BB, 303 N. Bancroft St., Indianapolis, Ind., is illustrated in a 4-page folder, which shows 16 ways to use the gage.

59. Precision Lathe. Folder describes "Stark" precision lathes, Model No. 2, made by Stark Tool Co., Dept. MBB, P.O. Box 22, Maynard, Mass. Two lathes shown. One with six-position turret, self-indexing and semi-automatic, Pt. No. 23610, and one with Forming slide rest and lever chuck holding tailstock Pt. No. 23670.

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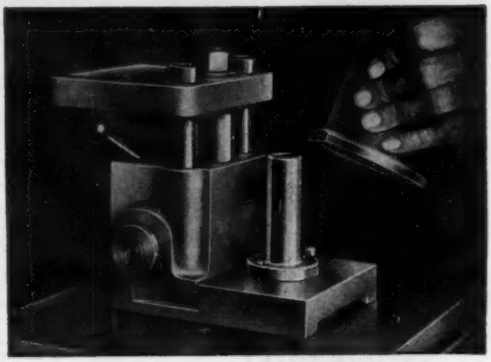

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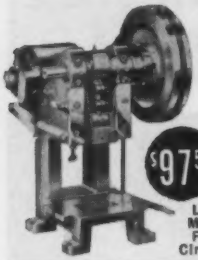

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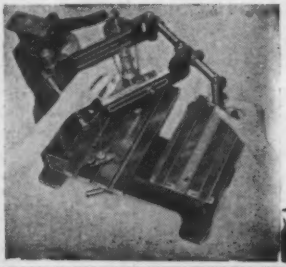

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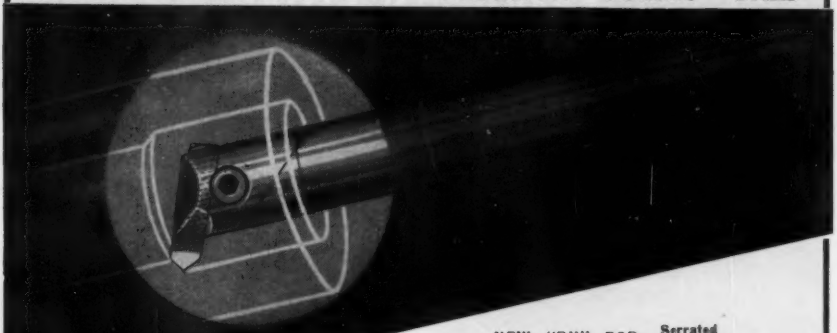
NEWEST DEVELOPMENT IN PRECISION BORING BARS



NEW "BH" BORING BARS are designed to overcome the major disadvantages of conventional bars:

- Both clamp and insert are serrated to insure the firmest grip possible, even with little pressure on the clamp.
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- Carbide and HSS inserts have a half-elliptical shape for better side clearance and more strength, less chatter.

Serrated HSS or Carbide Tool Bits

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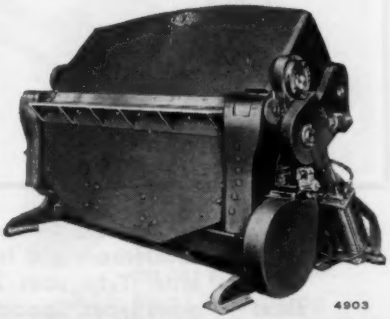

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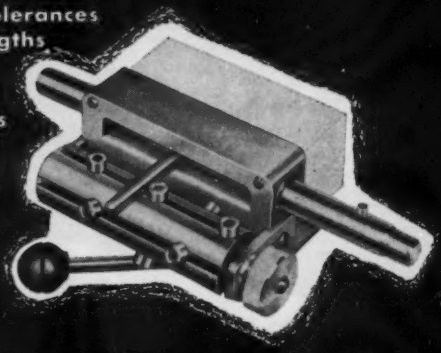

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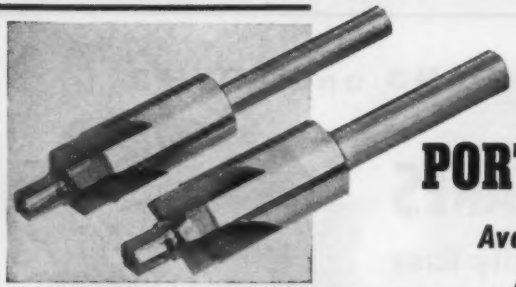

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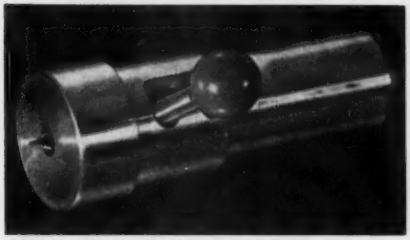
Lathe tool provides center drilling throughout production run

A tool for production turret lathe work which provides accurate center drilling throughout a production run is called the Identi-Center, and is a combination rotary stock stop and center drill holder. The unit occupies one hole in the hex turret of the lathe. When measuring off stock, there is no need to shut off the machine, since the hardened cap of the tool rotates on a



ball bearing when the stock meets it.

For center drilling, the operator backs up the turret about an inch and shifts a lever which brings the center drill into position. It is then fed in until the rotary cap revolves again and the operation is complete.

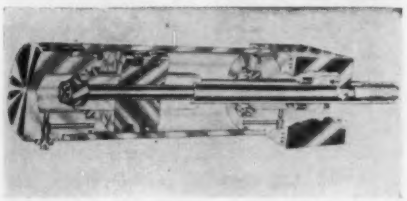
Shank diameters available are 1", 1¼", 1½" and 1¾". Schultz Mfg. Co., 3444 Orange Avenue, Dept. N-20, Cleveland 15, Ohio.

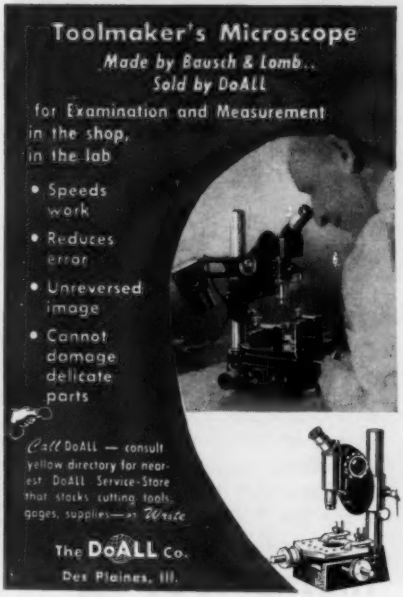
Use ACTION Card, opposite page 64. Encircle No. 12

Improved cylinders for air or oil

T-J Spacemaker cylinders are now made for use with either air or oil.

Unusual compactness results from elimination of tie rods. Cylinders are

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LOCKJAW

Set-ups stay put! Grips both downwards and sidewards... eliminates bolting and clamping. Used on all table top machine tools. 2 sizes available. Write for Bulletin 140-A.

RIVETT LATHE & GRINDER, Inc.
Dept. MTBA1
Brighton 35, Boston, Massachusetts

now offered with the same mounting diameter in either an air cylinder or a low pressure hydraulic cylinder—for a maximum of 200 psi air or a maximum of 750 psi oil.

Improved, faster acting cushions have been developed for this new line. Tomkins-Johnson Co., Dept. B, Jackson, Mich.

Use ACTION Card, opposite page 64. Encircle No. 13

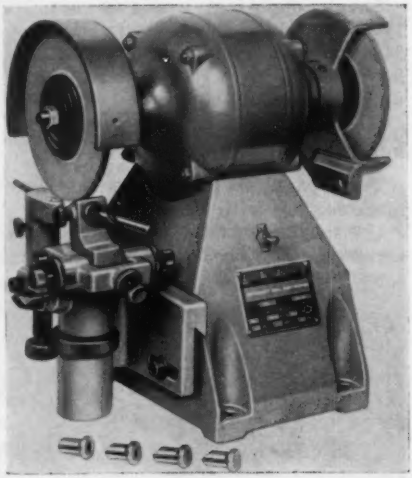
Crankshaft drill point grinder

Union Twist Drill Co., Dept. B, Athol, Mass., has announced a crankshaft drill point grinder for drills ranging in size from No. 1 through No. 50, A through U, and 3/64" through ⅜".

The drill is rocked into the wheel to grind one notch, returned, indexed 180°, and the operation repeated for the other notch. An adjustable diamond truing device trues the wheel with one quick motion. There is a tilting fixture adjustable for any sharpening angle and the company can furnish flute guiding drill bushings for each diameter of drill as needed.

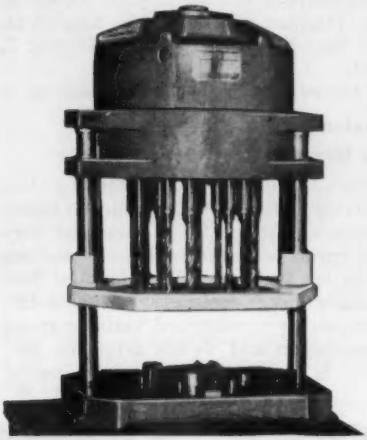
Motorized spindle mounts a 6" grinding wheel at one end and a 6" general utility wheel at the other. Motor is ¼ hp, 110 v, 60 cycles, 3450 rpm.

Use ACTION Card, opposite page 64. Encircle No. 14



Gearless drill head line expanded

Zagar Tool, Inc., Dept. MTB, has added a new 800 Series to its line of standard gearless drill heads. New series has spindles up to 2½" dia. for drilling holes up to 1½" dia. Holes can be drilled as close as the sum of any two hole



diameters: e.g., 1½" and ½" holes can be spaced as close as 2".

Any hole pattern can be drilled, any number of holes at one pass. All spindles rotate in the same direction and are noiseless in operation. Spindles can be relocated to suit part changes.

Use ACTION Card, opposite page 64. Encircle No. 15

Rubber tipped pressure foot

An improved one-piece pressure foot, in which a diamond point rubber tip is molded to a full length threaded 5/16" machine screw, has been announced by the West Point Mfg. Co., Dept. B, 26935 W. 7 Mile Rd., Detroit 19, Mich.

Pressure foot is claimed to insure rigidity in applying pressure to the work piece. It is adaptable for use with Wespo toggle clamps and can be used for clamping on aluminum and other light materials and for pressure applications on polished surfaces.

Use ACTION Card, opposite page 64. Encircle No. 16

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- Sine
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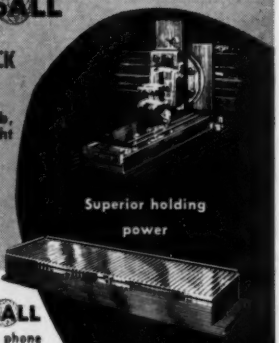

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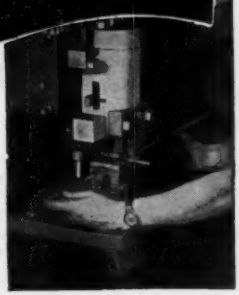
Adjustable Automatic Stock FEED STOP for DIES



Dahlstrom AUTOSTOP

No drill jig . . . no slotting . . . no milling. Specify whether for use on blanking, progressive or compound dies. Mounts on stripper plate in 15 minutes. $1.75 each; $18 doz.

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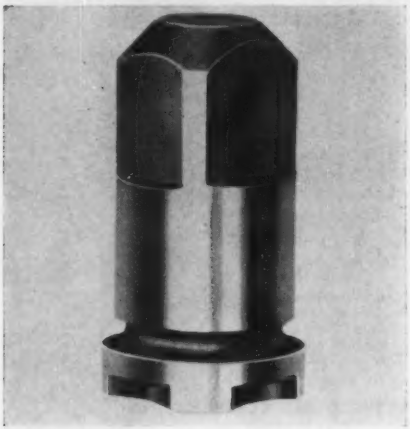
$1.75

Mill fixture key makes fixtures interchangeable

The Siewek mill fixture key eliminates the milling of a slot on the bottom of a fixture and makes fixtures interchangeable to any machine table. Each unit has a key for two table slots.



The keys have a constant stem diameter which allows operator, in the building of fixture, to bore two key holes and locate the building of the entire fixture from these holes. Since the keys are interchangeable and retained in the fixture with a lock screw similar to a drill bushing, fixture may be moved to any machine. Siewek Tool Co., Dept. BB, 2862 East Grand Blvd., Detroit 2, Mich.

Use ACTION Card, opposite page 64. Encircle No. 17

Torsion spring winder has large tooling area

The Torrington Manufacturing Co., Torrington, Conn., has announced initial production of the W-3001 heavier torsion spring winder capable of handling up to ten turns of .080" wire and featuring a larger tooling area, 12" x 18".

Driven by a motorized variable speed transmission and V-belt drive the machine is equipped with two sizes of

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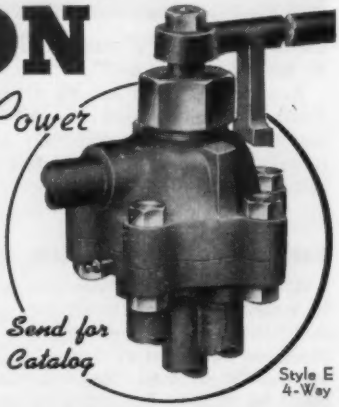

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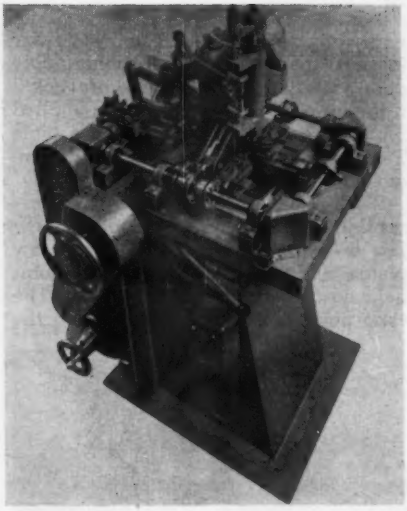

slide feeds: one handling up to 3½" of wire and the second feeding wire ranging up to 6¼" in length.

The winder's tool slides include two horizontal units, one right and one left-handed, and a vertical two-slide attachment which is available for use with the horizontal slides. Additional horizontal slides—coupled with shafts on three sides of the tool area—permit the production of complex wire forms.

Use ACTION Card, opposite page 64. Encircle No. 18

New version of lubricating system

The Henry G. Thompson & Son Co., 277 Chapel St., New Haven, Conn., has announced the availability of an improved version of the Atom-Lube lubricating and coolant system.

A nozzle of soft copper tubing that could be bent to direct the vapor spray to the edge of the cutting tool at the most efficient angle has been replaced with a 12" nozzle of flexible tubing provided with two interchangeable inner tubes. One—of copper—is used where the nozzle is seldom readjusted; the other—of flexible plastic—is recommended where the position of the nozzle

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Capacities to 6" when used with this Fairfield Gauge 3" Riser

The Micro-Height Gauge is a precision instrument, finished in satin chrome, which reads like a micrometer and measures from zero at base to 3" in thousandths.

Use as a scriber for fast layout, or insert dial indicator for quick, accurate inspection.

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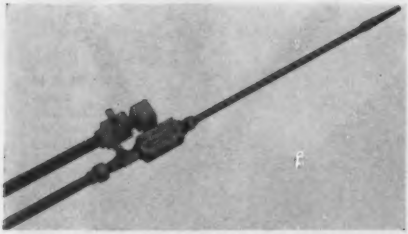


must be adjusted frequently. In addition, the Atom-Lube is now supplied with 4 feet of ¼" ID plastic hose for the coolant supply.

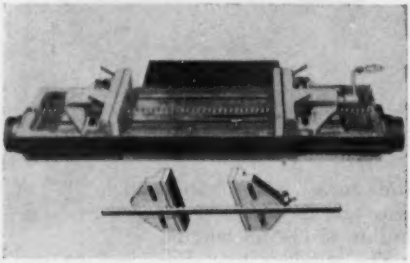
Use ACTION Card, opposite page 64. Encircle No. 19

Mill vise jaw opening limited only by table length

The mill vise just introduced by Universal Vise and Tool Co., Dept. MTB, Parma, Mich., has a jaw opening limited only by the length of the T-slotted machine table.

The independent jaws, one equipped with screw pressure unit and a tie-bar feature, mount on the machine table at any width opening and are prevented from slipping when pressure is applied by the tie bar that fits into the table T-slot and engages teeth in the bottom of each jaw.

Work may be held either by conventionally tightening the one screw jaw or by removing the two steel jaw plates and installing the cone point hold down bolts that are provided. The cone point hold down bolts enable the



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471 SHREWSBURY STREET
WORCESTER, MASSACHUSETTS

vise to accommodate a wide range of oddly shaped work. Each independent jaw is provided with two keys that fit into the T-slot of the table to insure proper alignment. By eliminating clamps and packing blocks on large work the vise allows clear machining over the entire surface of the work piece. Each jaw is 2½" high and 8⅞" wide. The standard tie bar will fit T-slots ½" or wider.

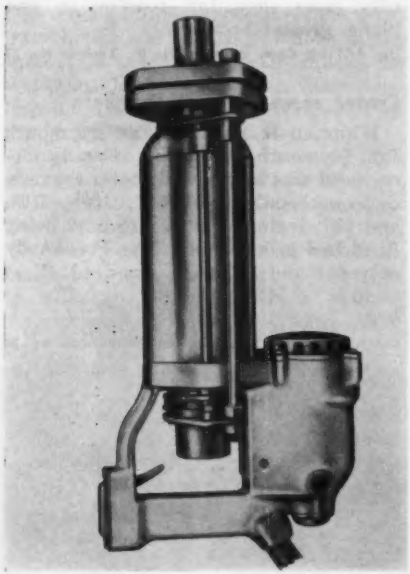
Use ACTION Card, opposite page 64. Encircle No. 20

Electromagnetic hammer drill has 3" dia. drilling capacity

The Syntron Co., Dept. M, 300 Lexington Ave., Homer City, Pa., has brought out an addition to its line of Electromagnetic hammer drills—Model 27-RO with a maximum drilling capacity of 3" dia. holes.

A change in construction, which has increased the power, together with the use of a core drill makes this capacity possible.

The drill is designed to speed up



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TOOL & MACHINE CO.
1929 S. 68th St., Milwaukee 14, Wis.

quantity hole drilling in concrete and masonry, features automatic rotation of the drill bit.

Use ACTION Card, opposite page 64. Encircle No. 21

Micrometer features continuous flow reading

Reading is in ten-thousandths on the Microfix micrometer being distributed by Karl A. Neise, Dept. B, 404 Fourth Ave., New York 16. Accuracy claimed, within .0001". Each graduation is marked

with its exact value. Tenths are marked on the sleeve, hundredths in the window, thousandths on the drum and ten-thousandths on the vernier.

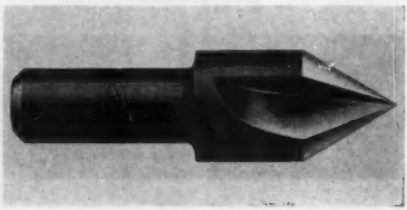
Called by the manufacturer "continuous flow," this type of reading reportedly gives easy, fast reading on one plane, greater accuracy.

Use ACTION Card, opposite page 64. Encircle No. 22

Center reamers, countersinks

Whitman & Barnes, 40600 Plymouth Rd., Plymouth, Mich., has recently announced that high speed center reamers or countersinks with 90°, 100°, 110°, and 120° included angle are now being furnished in its regular line. Previously only 60° and 82° were standard. Sizes include ¼" dia. to ¾" dia. inclusive by ⅛'s.

Use ACTION Card, opposite page 64. Encircle No. 23



Prealloyed steel powder

Vanadium-Alloys Steel Co., Dept. BB, Latrobe, Pa., recently announced the development of a new prealloyed steel powder for high strength powder metallurgy applications.

The new grade, 4650-A, is claimed to enable fabricators to produce high strength parts by briquetting and sintering without resorting to secondary treatments any more elaborate than simple hardening. The manufacturer reports a pronounced improvement in the toughness and hardenability of the powder.

Use ACTION Card, opposite page 64. Encircle No. 24

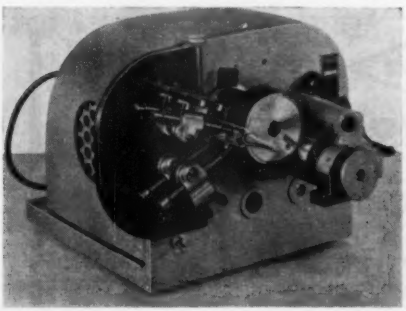
Marking cylindrical objects

A marking machine, Model 52AC, for printing complete label information on ampules, vials, small bottles, paper tubes, cylindrical electrical components, etc., will also handle cylindrical objects which cannot be chute fed because of their shape.

Machine is adjustable to handle objects ¼" to 1½" in diameter. An adjustable ball bearing cradle together with interchangeable printing plates eliminate the need for special chucks or work-positioning fixtures. Maximum imprint dimensions are 2¾" long, 1¾" top to bottom.

Production rate of the hand fed machine is 43 prints per minute. Ejection is automatic. Markem Machine Co., Dept. MTB, Keene 44, N.H.

Use ACTION Card, opposite page 64. Encircle No. 25



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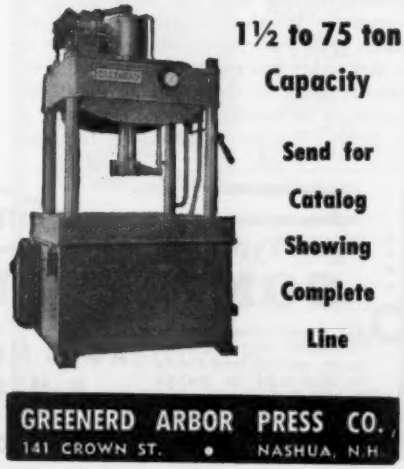
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1½ to 75 ton Capacity
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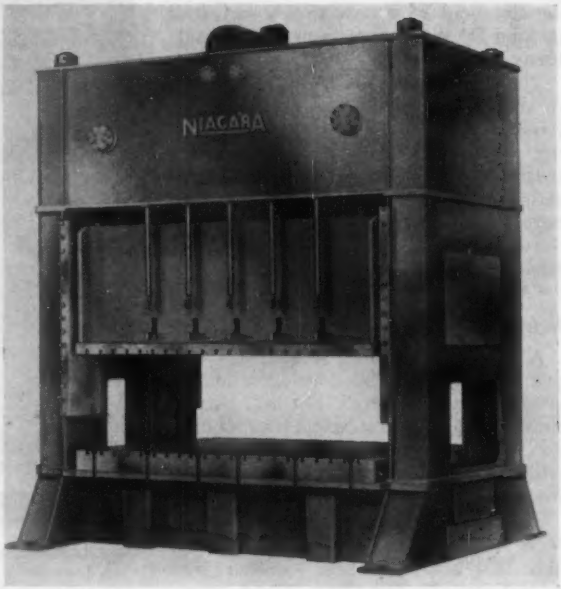
141 CROWN ST. • NASHUA, N.H.

Eccentric Geared Presses for Large, Heavy Tonnage Work

Designed to handle large, heavy tonnage drawing, punching and blanking work, a new line of straight side eccentric geared presses has been engineered by Niagara Machine & Tool Works, 637 Northland Ave., Buffalo 11, N.Y. Produced with one, two and four point suspension, covering a range of 100 through 1000-ton capacities.



These Series SE presses are for: work requiring large die areas; heavy tonnage demands; long stroke, deep drawing jobs where work is engaged high up on the stroke and bottom-of-stroke blanking and punching.

A key feature is the crankless eccentric drive which is claimed to deliver greater torque with less deflection. The eccentric is an integral part of the main gear (or gears) which rotates on a stationary pin rigidly supported in the crown, close to the point at which the pressure is exerted. Serving merely as a pivot, the pin carries no torsional load and relatively little bending load.

Frames are of all-steel, four-piece, tie-rod construction. Low-inertia, pneumatic friction clutch is designed so that most of the weight of the clutch continues to rotate with the flywheel. Only the drive shaft and driving plate start and stop with each cycle.

Use ACTION Card, opposite page 64. Encircle No. 26

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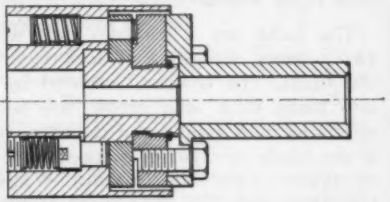
TRADE AUTOM MARK
CLOSED
Plain Type
Offset Type
OPEN
OPEN
CONTINUOUS HINGES
All hinges shown can be furnished with special holes, cutouts and bends to blue-print in metals to suit the job.
THREE-FOURTHS OFFSET
AUTO MOULDING & MFG. CO.
1110 E. 87TH ST.
CHICAGO 19, ILL.
SPECIFICATIONS:
Open width 7/8" to 6"
Gage Material .040 to .125
Pin Diameter .101 to 3/8
Lengths to 120"
SEMI-OFFSET

Releasing-type tap holder cuts tap breakage

Design of this releasing-type tap holder permits accurate tapping to depth on duplicate workpieces with minimum tap breakage, according to the manufacturer, the Marcellus Mfg. Co., Dept. BB, Belvidere, Ill.

The secret of the holder is claimed to lie in the design of the spring-loaded clutch pawl and clutch plate mechanism. Once adjusted for depth, the pawl automatically releases the tap at the precise depth required. Reversing the work



spindle automatically backs the tap from the hole. Units of this type have performed production tapping operations to within .005" in depth, and can be adjusted to tap as few as two threads before releasing.

Releasing mechanism is interchangeable for right or left-hand tapping. Reversing mechanism is designed to eliminate binding and reduce the danger of tap breakage. Four sizes accommodate tap shanks from ½" to 1½" in diameter.

Use ACTION Card, opposite page 64. Encircle No. 27

Face mill for large depths of cut

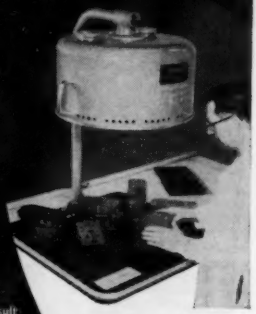
This new cutter series was designed for extra heavy steel and cast iron roughing operations where large amounts of stock must be removed in one operation.

The cutter body is a 6145 steel forging with thicknesses from 3¼" to 3¾". The special 1½" high replaceable carbide tipped blades, capable of ⅞" depth of cut, are locked with Wesson Dual Wedg Locks which, combined with deep

DoALL 20" MONOLIGHT

lets you inspect flatness of large surface areas or groups of parts

- Checks flatness in millionths
- 30" x 30" work area
- 20 foot-candle intensity
- Mercury light



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The DoALL Co.

Des Plaines, Ill.

13

PORTABLE
ELEVATING TABLE

Saves TIME and LABOR

Eliminate heavy lifting and cut handling costs. Slight foot pressure varies height from 31" to 46½", leaving operator's hands free. Table swivels and locks in any position.

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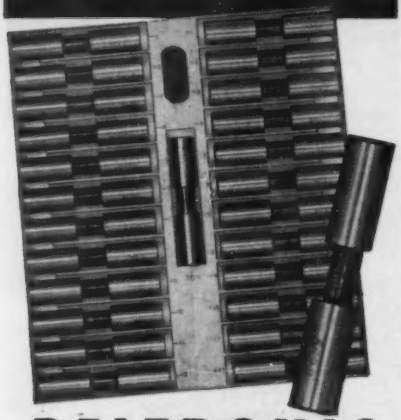
THE MIDWEST TOOL & ENG. CO.
112 WEBSTER ST., DAYTON, OHIO

CLOSER PRODUCTION TOLERANCES!



DELTRONIC Tenth Plug Gauges

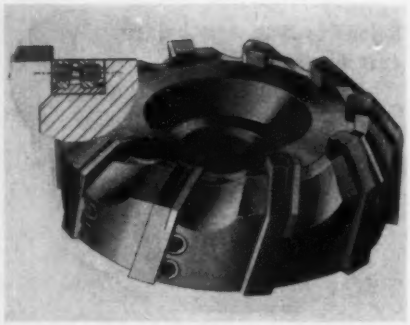
save time and material, too!

This new system of precision gauging in sets of 25 provides one gauge of nominal size plus 12 gauges of increasingly larger sizes in .0001" increments and 12 gauges of decreasingly smaller sizes in increments of .0001".

- ★ Size variation by ten thousandths
- ★ Available in increments of 1/64" from 1/8" to 1"
- ★ Set of 25 costs approximately same as Go and No Go gauge
- ★ Hardness is Rockwell C62/C64

For further information write Dept. D.

DELTRONIC CORPORATION
9010 BELLANCA AVENUE
LOS ANGELES 45, CALIF.



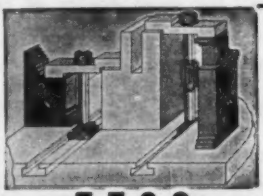
blade serrations, are claimed to enable rapid and accurate blade setup.

The locks are a compact unit with two moving wedges that lock against the blade. The wedges, actuated by a few turns of a lead screw, are self-adjusting both axially and radially even if the blade is tapered, stepped or out of square. (See illustration.) Wesson Co., Dept. BB, 1220 Woodward Heights Blvd., Detroit 20, Mich.

Use ACTION Card, opposite page 64. Encircle No. 28

Fork lift truck working model

A small working model of the Towmotor Model 480-P fork lift truck, replica of the "One Man Gang," has many of the features of its prototype. The forks may be raised or lowered; the mast tilts, and the model rolls on rubber tires that are, in miniature, identical



—T T C O—

Sure Grip Step Blocks and Stud Sets Clamp Assemblies at low prices.

TIETZMANN TOOL CORPORATION
DEPT. C. T. ENGLEWOOD, OHIO

to those used on the big standard trucks.

It is eight inches long to the tips of the forks, five and one-quarter inches high to the top of the mast, and two and three-quarters inches wide. While designed to serve as a planning tool for materials handling executives, its greatest demand seems to come from the younger set. Towmotor Corp., Sales Promotion Department BB, 1226 East 152nd St., Cleveland 10, Ohio. The price: $3.95 postpaid.

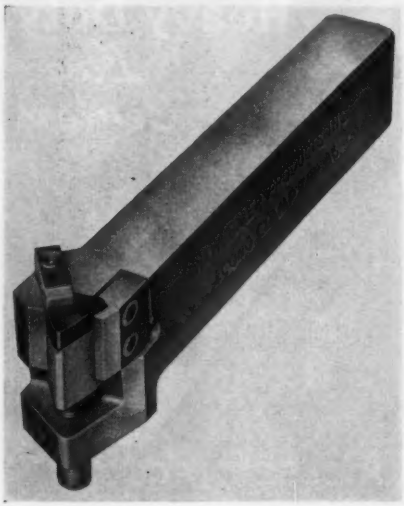
Use ACTION Card, opposite page 64. Encircle No. 29

Tool holders for triangular, square, round carbide inserts

Newcomer Products, Inc., Dailey Ave. Ext., Latrobe, Pa., has announced a new line of Econo-Clamp mechanical tool holders for use with triangular, square and round carbide inserts.

The side and top clamping features plus a hardened steel anvil are claimed to permit the use of all the carbide of any length insert. Holder may be used for both heavy roughing and precision finishing operations.

Use ACTION Card, opposite page 64. Encircle No. 30



DoALL GAGE BLOCKS
• Another precision product manufactured by DoALL
• Rectangular type
• Grades AA, A and B
• Complete line of accessories
18 Sets 3 to 118 pieces
Blocks up to 10" long
TEXTBOOKS
Gage Block Height Tables $2.95
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Call DoALL
see classified phone directory for nearest DoALL Service-Store — complete stock of gages, cutting tools, supplies.

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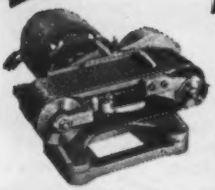
RIVETERS . .
PIONEERS and PACE-MAKERS in their line
—head rivets from smallest to ¾" diameter either by NOISELESS SPINNING or VIBRATING HAMMER method—sizes to meet all needs—types include Vertical and Horizontal Multiple Spindles.
Write for literature and don't forget to send samples
THE GRANT MFG. & MACHINE CO.
CE Station, Bridgeport 5, Conn.

DOES IT BETTER
DOES IT FASTER

SIMPLEX-M
ABRASIVE BAND GRINDER



The precision of a machine tool plus the durability of a workhorse. Complete with ½ H.P. Heavy Duty Motor and automatic band tension control. Nothing like it for finishing metals, plastics, wood, fibre, etc.

OTHER STYLES AND SIZES IN NEW MANUAL ON FINISHING—WRITE TODAY

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TAP MAGIC

A Compound for
Tapping • Threading • Drilling • Reaming

NOT A CUTTING OIL!

SPEEDS Tapping and Threading
CUTS Clean Threads **STOPS** Tap Breakage
FREES Stuck Taps Instantly

EFFECTIVE ON ALL METALS
Alloys . . . Castings . . . Aluminum . . . Brass
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Steel (Mild, Normalized
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A standard 4 oz. can Postpaid $1.00 and the name of your local supplier

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This is Fast Moving . . . Repetitive Merchandise

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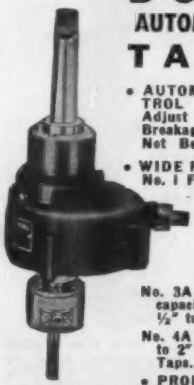
DORMAN
AUTOMATIC REVERSE
TAPPERS



- AUTOMATIC TORQUE CONTROL . . . One Minute to Adjust . . . Prevents Tap Breakage . . . Operator Need Not Be Skilled.
- WIDE RANGE TAP CAPACITY No. 1 FRICTION DRIVE TAPPER —Capacity No. 2-56 to 3/8" In Steel ½" In Aluminum. No. 2B POSITIVE TAPPER—capacity 3/8" to 7/8" In Steel

No. 3A POSITIVE TAPPER—capacity ½" to 1¼" in Steel. ½" to ¾" Pipe Taps.

No. 4A TAPPER—Capacity ¾" to 2" In Steel Including Pipe Taps.

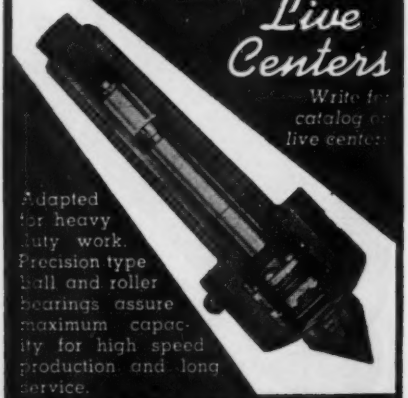
- PRODUCTION THREADERS with Round Split . . . Button . . . Acorn Dies
- IMMEDIATE DELIVERY

Price from $50.00. Write for Bulletin.

THRIFTMASTER PRODUCTS CORPORATION
Division of Thomson Industries, Inc.
1030 N. PLUM STREET, LANCASTER, PA.
STANDARD UNIVERSAL ADJUSTABLE AND SPECIAL FIXED CENTER DRILLHEADS

NIELSEN
Heavy Duty
Live Centers

Write for catalog of live centers



Adapted for heavy duty work. Precision type ball and roller bearings assure maximum capacity for high speed production and long service.

NIELSEN, INC. LAWTON, MICH.

Torque thumb screws

Siewek Tool Co., 2862 E. Grand Blvd., Detroit 2, Michigan, has announced the addition of a complete line of torque thumb screws, in four styles and twenty-one sizes, to their line.

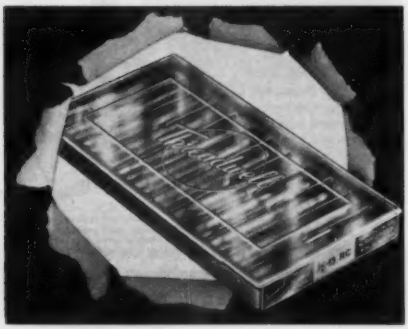
Screws may be disassembled by

means of removing a snap ring to clean the area retaining the ball and spring which govern the torque action of the unit.

Use ACTION Card, opposite page 64. Encircle No. 32

New packaging for taps

Threadwell Tap & Die Company, 16 Arch St., Greenfield, Mass., has an-



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HSS CUTTERS
Increase Milling Production because:
• Made from forged blanks – dense structure permits finer edges
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• 64-65 "C" scale hardness guaranteed
Call DoALL — consult classified phone directory for DoALL Service-Store that stocks gages, cutting tools, supplies, — or Write
The DoALL Co.
Des Plaines, Ill.

Hinged Hammer Moulds

1, 2½ and 5 lb. sizes—order your alloy lead hammer requirements from your machine tool supply house

or direct from:

KITZMAN MFG. CO.

15061 Hartwell Ave. Detroit 27, Mich.

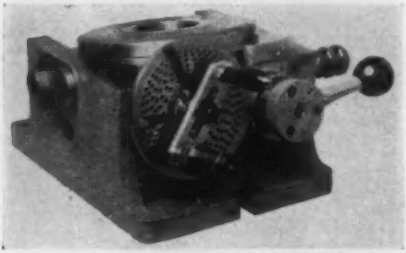
nounced plastic packages for its complete line of taps from No. 0 M.S. through ½". The boxes will cover this range with 3 sizes, each accommodating 12 taps.

Built-in partitions protect the cutting edges from one another, and a locking device keeps the sliding cover closed in transit.

Use ACTION Card, opposite page 64. Encircle No. 33

Tilting semi-universal dividing head

The Walter tilting semi-universal dividing head SHU IV is claimed to be



easy to handle; concentricity of run is maintained for a long period, even under rough working conditions.

Features include: variety of indexing operations, such as quick indexing, plain indexing and indexing in degrees; swivel range of 90°; low construction in vertical position. Karl A. Neise, Dept. B, 404 Fourth Ave., New York.

Use ACTION Card, opposite page 64. Encircle No. 34

Automatic Rockwell hardness tester

A fully automatic Rockwell hardness tester has been announced by the Wilson Mechanical Instrument Div., American Chain & Cable Company, Dept. BB, New York 17, N.Y. Operating on the identical principle of the hand-operated tester, it is capable of performing between 1000-1200 tests per hour. Pieces being tested are power fed into the tester and automatically placed in position beneath a diamond penetrator. Testing loads which force the diamond into the material to determine its hard-

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Drys fast! Oil resistant!
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Over 85% of the torque wrenches used in industry are
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Read by Sight, Sound or Feel
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in inch grams
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Every manufacturer, design and production man should have this valuable data. Sent upon request.
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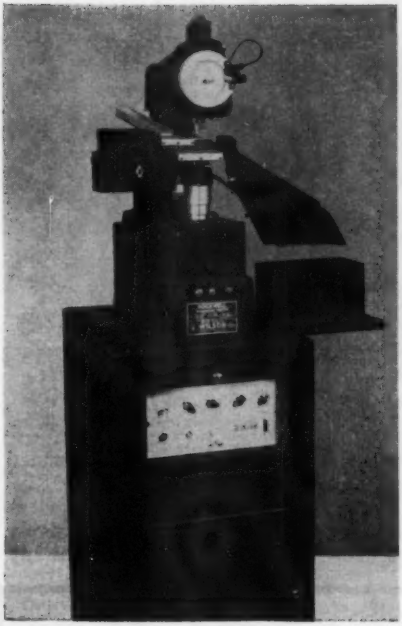
ADDISON QUALITY ILLINOIS



ness are applied and removed, with the resulting hardness indicated on a dial. Minute photo-electric transistors pick up this hardness indication, transferring the reading to impulses, which actuate relays, which in turn classifies the material being tested according to correct hardness.

A control regulates the up and down travel of the elevating screw so that it is not necessary to have the pieces all the same thickness for automatic testing. Likewise, a control is available to limit the dwell at the end of the travel of the elevating screw. The length of time that the pointer remains at the correct hardness position is also controlled.

Classification is done by means of photo-electric units mounted on the bezel rings of the dial gage. These units may be set so that hardness limits as close as two points may be controlled.

Use ACTION Card, opposite page 64. Encircle No. 35

NEW DoALL High Speed Steel SAW BANDS

- Up to 10 times faster cutting!
- Up to 30 times longer life!
- Full safety blade

—see directory for nearest DoALL Service-Store that stocks cutting tools, gages, supplies.

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The DoALL Co.
Des Plaines, Ill.

DoALL Precision

DoALL Buttress

¼" to 1"
2 to 10 pitch

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The most economical LEAKPROOF, LIGHTWEIGHT, DRAWN TOTE PAN *offered to industry*

OUTSIDE DIMENSIONS
DEEP — 5½"
LONG — 18¼"
WIDE — 10 3/16"

There Are 25 Nested Tote Pans in Above Photo

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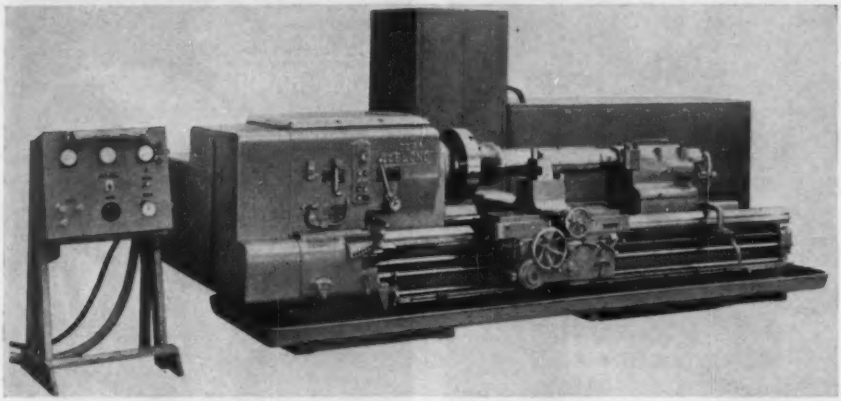
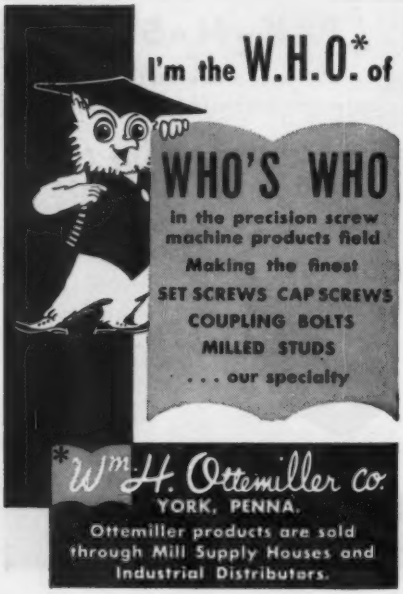
BATHEY MFG. CO.
100 SO MILL ST PLYMOUTH MICH

Lathe tests show 118 hp consumed at the cut



The R. K. LeBlond Machine Tool Co., Dept. BB, 52 S. Madison Rd., Cincinnati, has announced the development of a 32" heavy duty engine lathe equipped with a 125 hp motor. Tests of the new machine show 118 horsepower consumed at the cut.

According to B. N. Brockman, vice-president, the horsepower effectively used by this lathe exceeds that of any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in the precision screw machine products field
Making the finest
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COUPLING BOLTS
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Columbus Die-Tool has been solving tooling problems for over 45 years. Expert designers and builders of all types of tools and special machinery. Write us today!
COLUMBUS DIE-TOOL
and Machine Co.
P. O. BOX 750 • COLUMBUS, OHIO

currently available machine of comparable size.

Specifications of the new 32" lathe include: 125 hp, 2-speed dc motor; infinitely variable speeds from 42 to 1400 rpm; 56 feeds from .002 to .250 ipr. Standard features include 4-directional power rapid traverse built into apron; one-piece apron and hardened rack; totally enclosed quick-change box; hardened and ground steel bed ways; thrust-lock tailstock.

Details of the test which registered 118 hp at the cut are: 12½" dia.; 48" long; SAE 1045; Brinell 200 plus; 205 sfpm with surface meter; 63 rpm with tachometer; .083" feed per rev.; 1" depth of cut; 2 hp reading on meter before cut; 120 hp reading on meter during cut.

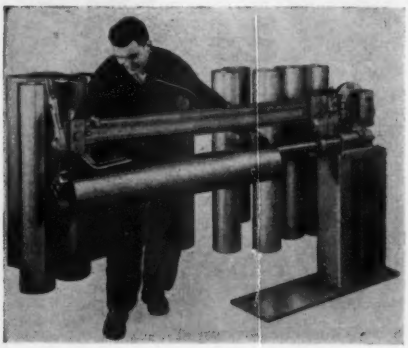
Use ACTION Card, opposite page 64. Encircle No. 36

Power groover closes both single and Pittsburgh lock seams

With interchangeable horns and rolls, the Niagara universal power groover (Model 48-U) is claimed to be the first machine built for closing both single lock seams and Pittsburgh lock seams.

Power driven, it is designed to reduce operator fatigue while eliminating the noise, delays and uncertainties of hand tools. Convenient controls provide fast, smooth operation.

With a nominal working length of 48", the groover is equipped with ad-



You Can Cut Cost Per Hole with DoALL Reamers because:

1. Special processing gives more holes per grind.
2. Faster feeds can be used.
3. DoALL stocks more sizes and types than anyone else.

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CYLINDRICAL GAGES...

ALL FE GAGES are

Made by skilled workmen from highest quality material. Constant size and continued accuracy are assured by sub-zero treatment. Each gage rigidly inspected.

Emergency situations in your plant solved by our unusually prompt delivery.

We specialize in large size ring gages. Write for 8-page descriptive catalog.

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- MACHINE KEYS
- MACHINE RACK
- TAPER PINS
- COTTER PINS
- SPECIAL PARTS

and other Stanho products
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STANDARD
Since 1872 HORSE NAIL CORP.
NEW BRIGHTON PA

YOST DRILL PRESS VISE

This new Yost vise has been designed expressly for use on drill press operations. Does away with special and costly jig fixtures.

Offered in two sizes.

Vise No.	Width of Jaw, Inches	Opens Inches	Weight Pounds
1D	3½	3½	12½
2D	5	5½	23

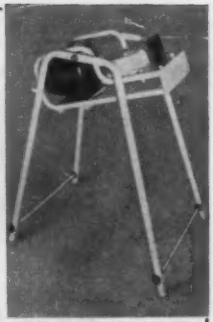
Do you need a vise of ANY type?

Write today for bulletins on the extensive Yost line

YOST MFG. COMPANY
1335 SO. MAIN STREET
MEADVILLE, PENNSYLVANIA

NEW!

- ★ Heavy Duty Type
- ★ Jam-proof, Automatic
- ★ Portable Lightweight
- ★ Up to .050 Stock Capacity



Birtwell

SCRAP CHOPPER

Suspended to "float" freely . . . cannot cause any bow (back pressure) on outcoming waste stock from your press. Replaceable cutters. Light (50 lbs.) and compact, here is a portable unit that will get plenty of use in your shop!

FREE BULLETIN . . . full information, prices. Write today! (Dealers: write for discounts.)

ONLY **$149.50** Complete

NORTHEASTERN
Development Engineers, Inc.
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Save your large
JIG BORERS
for large jobs . . .
put small precision
work on the
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The Linley Jig Borer provides the means . . . at very low cost . . . of handling your most exacting requirements in precision. With it you can cut costs through having a tool exactly fitted to your small work . . . save your larger machines for larger work.

SPECIFICATIONS
Table Movement: 6"x10" Table Size: 7"x17½"

Send for complete information TODAY!

LINLEY BROTHERS CO.
663 State St. Ext. Bridgeport 1, Conn.

Presses feature double action drive

Uncluttered design and greater compactness are made possible by the one-point, double action, right-to-left drive used in a new series of presses being made by Danly Machine Specialties, Inc., 2100 S. Laramie Ave., Chicago.

This press has a 26" stroke and 60" shut height on the inner slide, yet the over-all height of the press is only 21'. Compactness has been achieved by placing the drive on the back of the crown and bringing the blankholder linkage down into the uprights. Special shallow bed construction, without sacrifice of rigidity, reduces the height and eliminates the need for an installation pit.

Adjustments for the blankholder have likewise been kept inside the body of the press to maintain the clean line. Linkage bearing surfaces and blankholder gibs are constantly flushed with filtered oil from the automatic circulating lubrication system. An eddy current clutch provides electrical acceleration of the slide motion for faster stroking rates without exceeding safe drawing speeds.

Use ACTION Card, opposite page 64. Encircle No. 39

Call DoALL for all types of MICROMETERS (Tumico)

Blade Type

Triflumic

Hole Locater

Rolling Mill Mikes
Spar Mikes
Mike Sets
Over-the-Bar Mikes
Inside Mikes, etc.

Die Maker Squares
Snap Gages
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The DoALL COMPANY
Des Plaines, Illinois 41

THE VISE WITH A THOUSAND GRIPS

'FLEXIBLE JAWS' grip all shapes. Grips secure and positive for precise milling, drilling and cutting operations. Eliminate the time and expense of blocking and shimming irregular pieces for toolroom machining. Applicable on any machine tool. Try it in your shop. Save time and dollars on small production runs.

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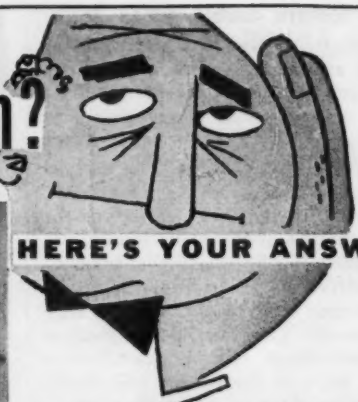
HAVE A

milling problem?



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PORTLAND'S HEAVY DUTY MILLING HEAD

The PORTLAND milling head was especially designed and engineered to solve heavy duty milling problems . . . milling of armor plate, special alloys, etc. These heads are easily adapted to outmoded planers . . . converting them into powerful, modern, efficient planer-type milling machines.

SPECIFICATIONS

- Heads provided with 22 speeds in ranges up to 1000 RPM
- Infinitely variable Hydraulic feed from 0 to 60" per minute
- Designed for right and left hand, horizontal and vertical operation
- Horsepower ratings available from 10 to 100

Write for complete information today Ask for Bulletin BB

PORTLAND MACHINE TOOL WORKS, INC.

FOOT OF BROADWAY, **SOUTH PORTLAND, MAINE, Telephone 3-0231**

Rotab improved

Machine Products Corp., Detroit, Mich., has announced new features and improvements in the production of the Rotab, device calibrated for movement in all planes, to facilitate the numerous machining and checking of radial and angular operations.

An optical micrometer microscope with glass vernier recticle permits direct reading to 5 seconds of an arc on a special graduated ring with clockwise and counter-clockwise markings from 0 to 360 degrees. The ring, which is located directly under the rotating table and is rotated to the desired degree setting and clamped in position to become a fixed part of the table, is individually processed with optical precision to avoid accumulative error in degree markings.

The center spindle mounted on pre-loaded precision bearings, extends beyond the back plate and provides a convenient and accurate point to attach a sine bar when the face plate is in a vertical position for obtaining radial measurement from a shelf by jo-block setting.

Rotab is made in four sizes: with 12", 24", 36" and 48" dia. face plate with motor drive for rotation on the larger sizes, and power tilt on 36" and 48" sizes.

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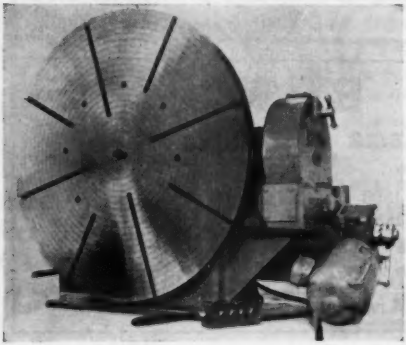

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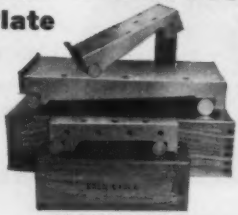

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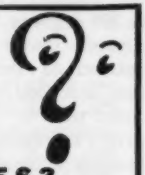

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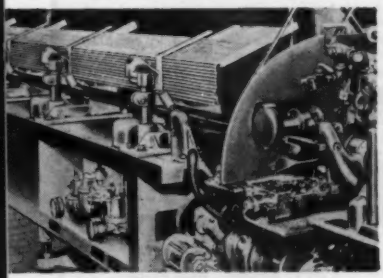

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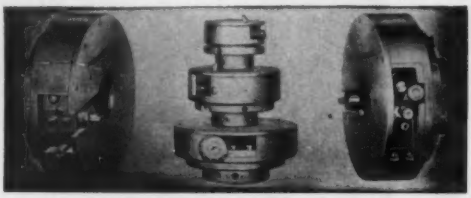

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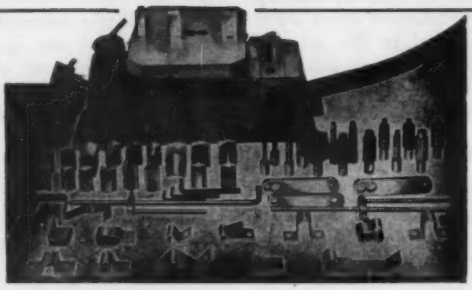

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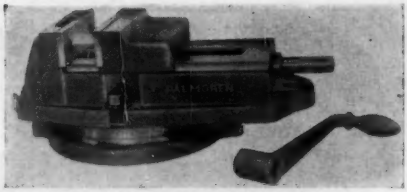

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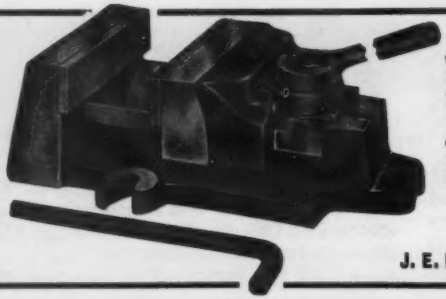

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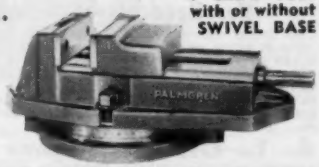

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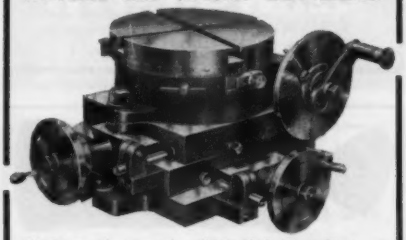

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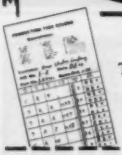

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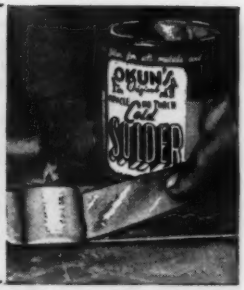

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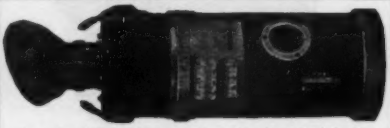

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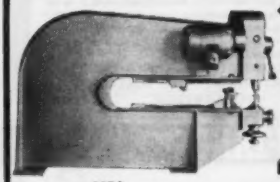

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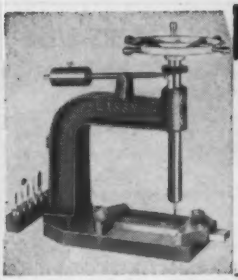

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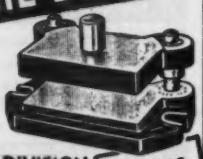

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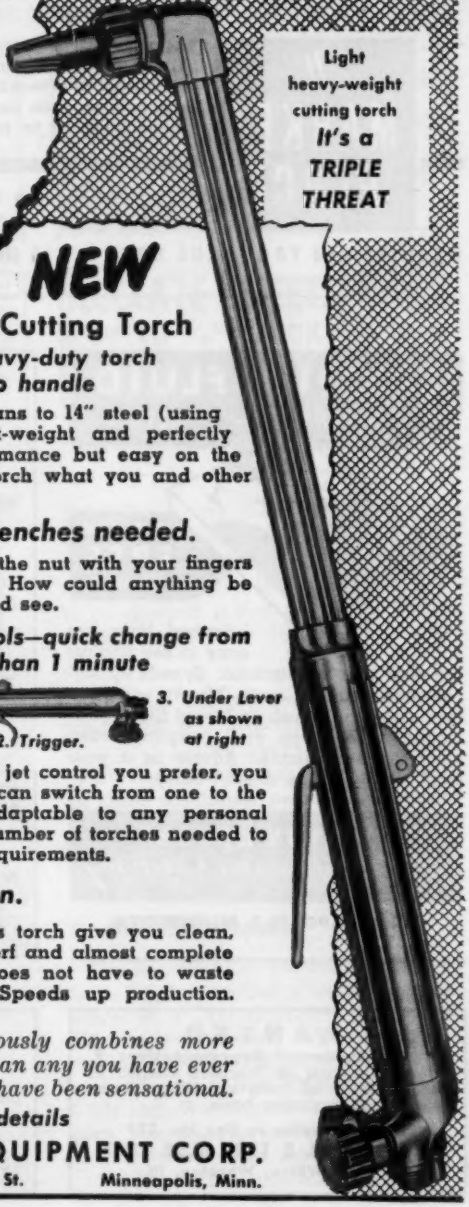

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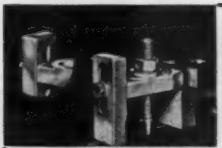

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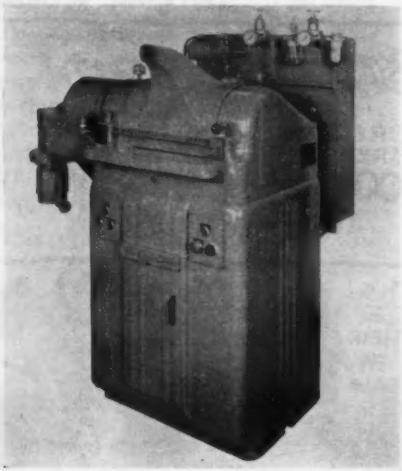

10" OD capacity machines include air cylinder clamping and braking controls and a push button controlled automatic operating cycle in which the gear to be checked is run in contact with a mating production gear or a master gear.

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Use ACTION Card, opposite page 64. Encircle No. 64

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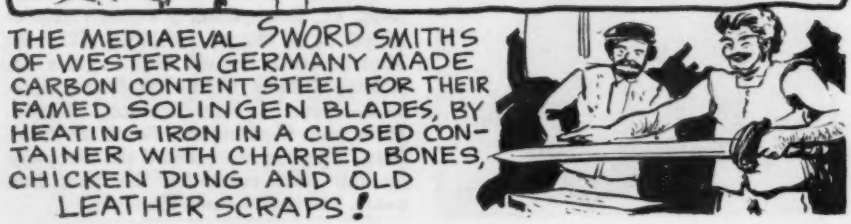
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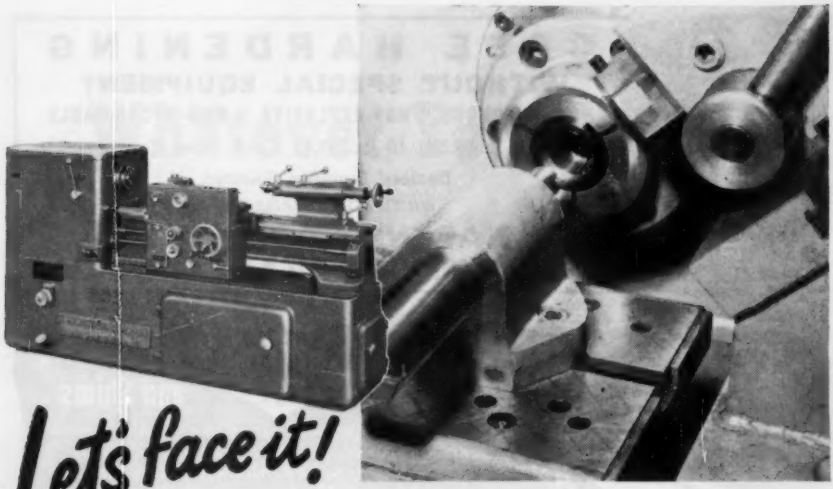

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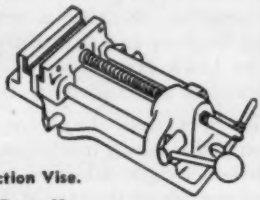

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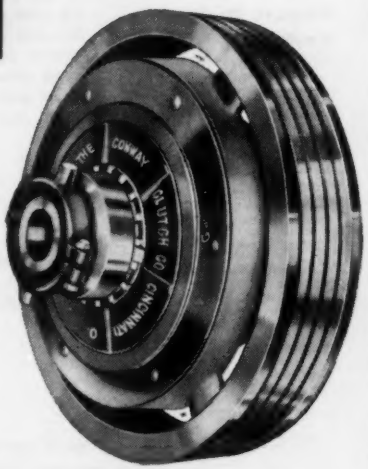

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10	28-30-36-40-48-64
12	20-28-32-36
14	20-24-28
1/16	60-64
5/64	72
3/32	48
7/64	48-56
1/8	32-40
5/32	32-36-40
9/64	36-40
11/64	36
3/16	20-24-32
13/64	32
7/32	24-28-32
1/4	18-24-26-27-30-32-36-40
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7/16	12-16-18-22-24-27-28-30-32-36-40
1/2	12-14-16-18-22-24-26-27-28-30-32-40
9/16	16-20-24-27-28-30-32-40-48
5/8	12-14-16-20-24-27-28-32-36-40
11/16	11-16-18-20-24-27-28-30-32
3/4	9-11-12-14-18-20-24-26-27-28-32
13/16	10-14-18-20-32
7/8	10-12-16-18-20-24-27-28-32
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5	40-44
6	32-36-40
8	32-36-40
10	24-30-32-40
12	24-28-32
1/4	20-28-32
5/16	18-20-24-28-32
3/8	16-24-32
7/16	14-20-28
1/2	12-13-20-28
9/16	12-18-20-24
5/8	11-12-18-20-24
11/16	11-16-24
3/4	10-16-18-20
13/16	16
7/8	9-12-14-18-20
1	8-12-14-16-18-20
1-1/8	7-12
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1-1/2	6-8-10-12-16-18-20
1-9/16	8-10-12-16-18-20
1-5/8	8-10-12-14-16-18-20
1-11/16	8-10-12-14-16-18-20
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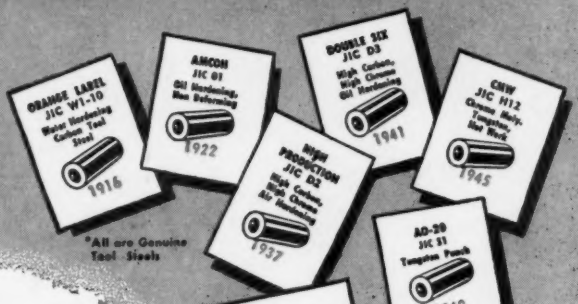

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